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LANDING THE BIG JOBS.

There may be a way of landing the big jobs other than working up to them. But don't try it. There is more work in trying to find that way than there is in the straight climb.—Everett R. Roeder.

Nation-Wide Co-Operation.

Telephone men have heard a great deal in recent years about co-operation. The value of unity of action has been dinned into their ears at conventions, and impressed upon their minds in every conceivable way until they would be excused for believing that nothing was left to be said on the subject.

In an address to the business organizations of the country, however, John H. Fahey, president of the Chamber of Commerce of the United States, strikes a new note that is worthy of attention. "Restoring Shattered Confidence; a Lesson of the War," is Mr. Fahey's subject. He says:

"Shocked as almost never before in our history by the terrific impact of an unexpected war, the country's business was almost prostrated less than six months ago. The unsettling character of this disturbance, you well know; and yet, within this short period, the recovery from it has been little short of marvelous. Able and patriotic business men, and resourceful organizations of business men, did their full share, working shoulder to shoulder with the responsible heads of the government in repairing the broken-down machinery and in restoring shattered confidence. That this great historical happening will have far-reaching results cannot be denied. What the ultimate effect will be, depends largely on us as a people, on the wisdom of our statesmen and the courage and leadership of our business men. Perhaps this catastrophe has brought us to a keener realization of our common interest than ever before. The farmer and the worker have come to see their dependence on the transportation agencies and the business men, and, likewise, there has developed an equally better understanding on our own part of our relation to these other great interests.

"It seems clear that we are going farther out into the world than ever before; that America and things American will be better known in lands where we have been almost strangers. In this evolution let us see to it that our America carries the impression we would like to have it convey, that it stands for liberty and justice and honest dealing. On no other basis can our influence be long sustained. In the countries across the Atlantic, now rent by strife, but a few months ago things of serious portent were developing. Violent social, racial and religious prejudices were aroused over projected reforms in nearly all of them. Even civil war threatened. But when the cataclysm came, dissensions were forgotten over night. Rich and poor, high and low, came together in each nation in the common cause.

"The example is sharply before us. Do we need any greater crisis than that through which we have passed so recently to make clear to all of us the necessity of real national co-operation and understanding? It is quite as patriotic, it is quite as much our duty, that in the blessedness of peace we should forget prejudices and partisanships and undertake to work together efficiently and persistently, supporting with all our energy that which makes for the greatness of the republic and of its people.

"As we go forward in this effort we will surely find that so far as business is concerned, unity of action and efficient organization will prove a great instrument for helpfulness and service. It is with this sense of service that we should support it and work for it—for better business and a grander republic."

There is food for thought in the above quotation for every man who bears the title of American.

Take Faith Off the Scales

By HERBERT KAUFMAN

Take faith off the scales—you can't weigh and measure everything. The test tube, the foot rule, and the scales, have their limits. There are some matters beyond the reach of eyes and ears and fingers.

Human intelligence has steadily progressed since man took up his task of self-analysis and puzzled out his first clumsy utilization of his hands. One by one our faculties have been quickened and their functions organized; step by step we climb to higher efficiency, but we don't "know it all" by a long shot. We still dwell in a puzzle box and we haven't guessed one per cent. of its surprises. Every day another Jack Horner sticks his thumb into this inexhaustible world pie and pulls out an unsuspected plum, but there are still very few pioneers among us proportionate to numbers.

Most folks don't know how to use themselves to their own and universal advantage, and thereby humanity and the individual both lose advantages that could be seized if each of us would recognize the enormous potentialities in everybody.

Once in a while "accident" reveals opportunities, but it isn't accident that turns them to account. Things don't keep on happening with regularity and system, unless there's a combination of skill and will promoting the enterprise.

Look at it any way you please, there's a revealing force at the elbow of all originality. If you prefer to be colloquial, call it "hunch"; but the most autocratic of beings isn't entirely automatic.

There's an unseen power that makes the wheels of thought turn to originality. There's a silent, invisible presence assisting all advancement.

Names are just make-shift tags to identify facts, emotions, and happenings. We've gradually evolved a bookful of oral and printed symbols with which to translate our ideas, and included in our vocabulary are such words as "Hope" and "Confidence" and "Optimism" and "Courage" and the like. Who denies their existence? Yet even the indefatigable gentlemen, who weigh stars and dissect atmosphere and count atoms, can't prove by any physical agency that they are definite.

And it's just so with faith. You must believe or you can't do; you must feel sure or you can't achieve. If your brain can contemplate a possibility, you've had a message from out of the unknown; so set about transforming the vague hint into a concrete performance.

All that you have and use came into existence by the same route. Before its creation, the notion of a wheel was as astounding in the generation which had never beheld one, as the creation of a thousand-story building seems to the twentieth century.

Chemically and anatomically, the inhabitants of the earth are of standard construction and composition—a lot of machines built on one unvarying pattern. We may run a little odd in sizes and color, but in all important details we're "all there."

Races and members of races are inferior only in ratio to their determination. We accomplish as much as we think possible, and we rise only as fast as we feel faith.

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Methods of State Taxation of Telephone Companies

Many Plans in Vogue in Different States for the Taxing of Public Utilities—The Three General Methods With Their Advantages and Disadvantages—Tax on Gross Earnings Worthy of Serious Consideration—Special Taxes and Their Application

By E. C. Blomeyer

In a study of telephone taxation, one fact becomes apparent early, viz: hardly any two states in the Union tax their telephone companies alike.

So striking is this diversity in the methods of the various states for the taxation of such utilities—and almost all other utilities for that matter—that the special tax commission of Connecticut, after an exhaustive investigation of the taxation of public utility corporations in all states, says concerning it:

"Almost every possible method of taxing corporations has been tried by some state at some time. Many of the methods developed have been clearly defective in principle and have been proved failures by experience. . . . . One of the most serious defects in American taxation of corporations is the lack of uniformity of method among the several states. This is a source of constant expense and irritation to corporations that must be taxed in a number of different states. It leads to an unfair distribution of revenue as between the different states. In general, it is a cause of injustice and irritation to all parties concerned."

The early tax laws of most of the states provided no special methods for the taxation of public utilities. When the laws were made, the corporations or utilities were so few in number and of such comparative insignificance that no special attention was paid to them. Until comparatively recent times, such enterprises were taxed under the general property tax laws—the same as natural persons—as they are still taxed in some states now. Following later recognized needs, each state has developed individually its own corporation tax laws, until we have now almost as many methods for the taxation of public utilities as there are states in the Union.

The principal methods of taxing telephone corporations may be summed up under three general heads:

1. The ad valorem basis.
2. The tax on capitalization.
3. The tax on earnings.

The Ad Valorem Basis.

The ad valorem basis covers the taxes imposed upon the value of the property of the corporation. In some instances this tax covers only the physical property but in the majority of cases it is assessed upon both the tangible and intangible property, covering, under the latter head, franchises, good will and other invisible assets.

The ad valorem system, in some form or another, is now used in 41 states for the taxation of telephone companies. In 31 states, it is the principal form of taxation of such corporations. In 15 states this method is used exclusively, no other form of taxes being imposed. The remaining 26 states of the 41, impose additional taxes of one kind or another. Of these 26 states, nine tax on the gross receipts, in percentages varying from ½ of 1 per cent., as in New York and Oklahoma, to 6 per cent., the maximum charge on gross receipts in Maine. Fourteen of these states apply a license, privilege or franchise tax of different natures, four based on toll line mileage, two on the number of transmitters or instruments in service, and eight figured in various ways on the authorized or issued capital stock. The remaining two states of the 26 apply, in addition to the ad valorem tax, both a franchise and a gross receipts tax, although in one of these states (Pennsylvania) the ad valorem taxation applies only to realty and personal property in two cities, Pittsburgh and Philadelphia, and is exempt from such taxation elsewhere in the state. Texas, the other state, enjoys the distinction of being the only state in the Union to tax her telephone corporations all over the state in three distinctly different ways—upon the ad valorem basis under the general property tax, on gross receipts, and with a franchise or privilege tax upon the amount of their authorized capital stock.

Five of the 26 states mentioned, apply the ad valorem method of taxation to their telephone companies only on realty, which is assessed and taxed locally. Of these five states, two employ as the principal method of taxation a percentage charge on gross receipts, and three, a tax on capitalization.

In 16 of the 41 states using, in any manner, the ad valorem system of taxation, the assessment is made locally, usually by the county assessing officers. Assessment in the other 25 states is made by some state board or officer. To enumerate more specifically, the assessment is made in six states by a state tax board; in eight, by a state tax commission or commissioner; in three, by a state board of assessment; in four, by a state board of equalization; in two, by a state board of appraisal; in one, by the state council; and in one by the state comptroller. The foregoing division of the 41 states is not entirely correct, however, from the fact that in 16 of them there is a divided system of assessment—some classes of property (usually realty and personalty) being assessed locally, and the balance assessed by the state. It is apparent, therefore, that there is about as much diversity in the method of making the assessment as there is in the method of applying the tax.

Where property is assessed by the state, the rate used is usually the same as the general property tax rate. In one state (Virginia) the rate is specifically set at 35 cents on the $100. In another state (Massachusetts) the rate applied is a rate equal to the average of the general property tax rate for the three preceding years.

There are a number of objections to the ad valorem system of taxation for utilities, from the standpoint of both the state and the corporation. Considered from the point of view of the corporation, one of the most serious defects is the difficulty in obtaining a fair assessment of the property. So long as the company's accepted rendition is on the same basis of valuation as the rendition of every other property holder in the state, the corporation will suffer no hardship, but this is seldom, one might say never, the case. On the contrary, the corporation probably has more difficulty than the individual in obtaining an average assessment, especially when it must deal with the local taxation authorities or local equalization boards. It is generally accepted as a fair proposition to assess the utility "all the traffic will bear" which is based, no doubt, upon the idea that the utility is always highly profitable, and has plenty of money with which to pay its tax.

Telephone companies covering more than a local territory must bear a burden in the time and expense of appearing before a number of local equalization boards for the annual wrangle over their assessment. The writer has

known towns and counties where the rendition made by the telephone company is regularly increased every year by the local tax authorities—in some cases as much as 50 per cent.—on general principles, I suppose, and presumably with the idea of making the company appear before the equalization board each year to fight for its restoration to the amount turned in, with the chance that the company will fail to justify its claims and that the raise will "stick."

The corporation is left to the mercy of a board of three or five men who have no more than the layman's knowledge of the principles of taxation or the laws of the state on the subject. They know nothing whatever of the value of a telephone plant, and therefore exaggerate the value to be on the safe side. Personal prejudice or friendship often counts more than property values. If the state had deliberately set about to devise a condition which would draw the corporation into "politics" so far as taxes are concerned, it would be hard pushed to improve on this.

The larger telephone companies are forced to maintain a tax department, or at least a tax commissioner or an executive to look after their tax matters. From an economic standpoint, the ad valorem system of taxation of utilities often increases the cost of government.

Several states have expended thousands of dollars in making valuations of the property of utility corporations. Michigan, for instance, spent about $60,000 in appraising her railroads some ten or twelve years ago, and, as the Connecticut tax commission puts it, "was unable to adhere to the values thus obtained for the purpose of taxation, admitting that such values might either exceed or fall short of the true value of the whole system of the corporation. The Michigan commission was, therefore, compelled to correct its results by falling back upon the earning power of the corporations."

When assessments are made locally, the telephone company often pays on a different basis of valuation in almost every county. In fact, cases have been known where a telephone line was assessed as high as $100 per mile in one county, while an adjoining county placed the valuation of its own mileage of the same line, identical in construction, at $45 per mile.

It is a fact, of course, that many of the disadvantages enumerated are eliminated when the assessment is made by a state board, for then the assessment is at least uniform in the various taxation units of the state. So far as the telephone company operating in more than one county is concerned, it is certainly a benefit both to the company and to the state for the assessment of the property to be made by a state board, instead of local taxing units.

Tax on Capitalization.

Under the tax on capitalization method, the tax is applied having as its base the value or amount of the capitalization of the corporation. Where applied as the principal method of taxation of the corporation, the capitalization is assessed in lieu of the physical property; that is, an ad valorem tax is imposed upon the outstanding stock of the company, or upon the stock and other capitalization securities, such as bonds—usually valued at the marked price.

This method of taxation of telephone companies is employed in seven states to a greater or less extent but no state uses the method exclusively, or in lieu of all other taxes. The state most nearly approaching a system of taxation entirely on capitalization (Arkansas) applies an ad valorem tax on the market value of the stock and bonds, at the general property tax rate, but it also charges the telephone company a franchise tax of 1-20 of 1 per cent. on the amount of its capital stock. Of the remaining six states using this method of taxation, one (Indiana) assesses on the market value of stock and bonds, one (Ohio) on the market value of the capital stock, and one (South Carolina) on the market value of the capital stock, plus mortgages. Two of these three states (Indiana and Ohio) also assess and tax realty locally, and two of them (Ohio and South Carolina) impose a gross receipts tax in addition to the ad valorem tax on the capitalization.

The other three states of the seven using the capitalization tax, apply it clearly only as a partial measure of taxation. Illinois assesses the market value of stock, bonds and franchises, deducts from the total the asssessed value of the tangible property, and taxes the telephone company on the difference under the general property tax. Montana assesses the capital stock and franchises at the principal office of the company. All tangibles are also subject to the general property tax, assessed and collected locally, and Montana telephone companies are also subject to a county license tax of from $100 to $400 a year. Pennsylvania taxes the telephone company five mills on each dollar actual value of capital stock and four mills on each dollar of bonds owned within the state. It also imposes a gross receipts tax on the telephone company. As previously mentioned, real and personal property necessary to the business, is also taxed in the state of Pennsylvania only in the cities of Pittsburgh and Philadelphia, being exempt elsewhere.

Maryland formerly taxed utilities on the market value of their shares, deducting the assessed value of their real estate, which was taxed where located. This method was changed in 1914, so that the physical assets only are valued by the state tax commission. The practical effect of this change is to exempt from taxation the surplus value of the corporation as a going concern above the physical value of the property.

Where the tax on capitalization is used as the principal measure of the taxation of the telephone company, the state must apportion the valuation to the local taxing units. Various methods are used to accomplish this. Arkansas, for instance, apportions the valuation on the basis of stations and pole line mileage to the counties where the same are situated. Some states use a distinctly different plan, apportioning the valuation of the capital stock to the counties where the holders of the stock reside, where it is taxed in the name of the holders, the corporation paying the tax, which is at the rate of the general property tax.

In a number of states, incorporated telephone companies are subject to a nominal franchise, privilege or license tax. This is in some cases based upon the capitalization. But as this is not, strictly speaking, a tax upon capitalization as we have been considering such taxation in the foregoing paragraphs, such special taxes will be enumerated under a separate head.

It is argued by some that a general tax on capitalization is superior to an ad valorem tax for the taxation of public service corporations. The grounds upon which they argue is that "the market value of the securities of a corporation under normal conditions represents the real value of the corporation according to the estimate of investors and others who are best qualified to judge, and when made to include not only the stock but the bonds and perhaps also the floating indebtedness, this gives a real measure of the value of the investment in the corporation." But even those who argue thus in favor of this method of taxation, admit that there are serious difficulties in its application, as it will be endeavored to point out.

In the first place, the argument admits that such a tax is fairly applied only "under normal conditions," which is that, under any but normal conditions, either the state or the corporation will suffer. We can readily see when the *market* value of the securities is identical with their *true* value, taxation on capitalization can be supported—but such a condition does not always exist. While the writer does not profess to be expert enough to explain just what is the "true" value of a share of corporation stock, yet, he believes

his assumption will work out on either of the two most generally accepted theories.

If the "true" value of a share represents the net earning power of that share, then taxation on capitalization may be either too low or too high, because the market price of stock fluctuates more rapidly than the earning power. Especially is this true in the case of the larger corporations, with listed securities and large outstanding issues, subject to the manipulation of speculators. It is entirely possible that an active stock might be 10 or 20 points or more, either above or below the average market price or its true earning value, on the day when assessment for taxation is made—and the corporation, in consequence, taxed either too high or too low.

If the "true" value of the stock is represented by the value of the actual assets behind it, then we are simply getting back to ad valorem taxation on the property. If the true value should, as some assert, be derived by considering both the assets of the corporation and its earning power, then the situation is still further complicated, involving all the difficulties of ad valorem taxation and adding a few new ones for good measure.

Of the 1,916 telephone companies operating in the United States in 1912, with a gross income of $5,000 or more per annum—not to include the 30,317 companies with an income of less than $5,000—hardly 250 had outstanding listed securities. The difficulties of ascertaining the market value of the securities of those unlisted are obvious. Dealings in many of these securities are irregular; only about 30 per cent. of them pay dividends. Their par value cannot be considered, for between the par and market value there is little or no relation. Here we have about as much difficulty in obtaining a fair assessment valuation as in ad valorem taxation.

Finally, neither ad valorem nor capitalization taxation meet entirely the requirements of Adam Smith's first maxim of taxation: "The subjects of the state ought to contribute towards the support of the government, as nearly as possible, in proportion to their respective abilities." Said the Connecticut tax commission concerning ad valorem taxation: "The valuation of the property alone is, after all, not a true measure of the worth of the corporation, or of its tax-paying ability." With respect to the taxation on capitalization, it said: "Earnings are generally admitted to be the true index of tax-paying ability, which is sought more or less indirectly by other methods of taxation."

The Tax on Earnings.

The third principal method of the taxation by states of telephone companies—the tax on earnings—is a development of comparatively recent times. It represents, in those states where it is used as the principal tax on that business, a recognition of the fact that the general property tax is not properly applicable to utilities. The tax on earnings or revenue, is held by some authorities to be the ultimate solution of the problem of the most logical and equitable method of taxing such enterprises,

"The earnings of a corporation," says one commission, after an exhaustive study of the taxation of public utilities, "are the real basis of the value of the property, the value of its securities, and its tax-paying ability. This statement will be generally admitted at once, and it is also determined by the result of the experience of other methods of taxing corporations. As a matter of theory, the earnings of a corporation are the only true measure of its value and its tax-paying ability. The basis of earnings is also the simplest in practice and the one that involves the least administrative difficulty. The weight of authority of economists, practical experts, tax commissioners, and others, is distinctly in favor of the earnings basis. This is the system which is coming into more and more favor today."

In the early days of this method of taxation, there was considerable difference of opinion as to whether the tax should be based upon gross income or upon the net earnings. At first glance, the tax upon net earnings seems the superior, inasmuch as it is the net return that proves the value of a property and business, but the difficulty of correctly establishing the net return is apparent.

"Operating expenses are more or less a matter of bookkeeping definitions." In other words, the corporation might easily diminish its net earning—so far as its books were concerned—unless the state specified the accounting methods and inquired closely into all the revenue entries made. On the other hand, the amount of gross income is a matter not so easily within the control of the corporation, and one more easily determined, eliminating vexatious questions of proper or improper charges to expense.

Experience soon showed, therefore, that the better method was to apply the tax upon the gross income, and to regulate the proportionate difference between the gross and net earnings of different utilities by fixing the rate of taxation to fit as equitably as possible each business.

Eighteen states now use the tax on earnings, and all apply the tax on gross earnings. Four states employ this method exclusively in the taxation of telephone companies; that is, as a commutation tax, in lieu of all other forms of taxation. Minnesota charges 3 per cent. on the gross income and California 3½ per cent, Wisconsin applies the tax on a graduated scale; 2½ per cent. when the receipts are below $100,000 per annum; 3 per cent. when more than $100,000 and less than $300,000; 4 per cent. when between $300,000 and $500,000, and 5 per cent. when the receipts are $500,000 or in excess of that amount. Maine also uses a graduated percentage of from 1¼ per cent. to 6 per cent. according to the amount of the receipts.

Vermont taxes the telephone company 3 per cent. on its gross receipts, or, in lieu thereof, 40 cents on each transmitter and 30 cents on each mile of wire in use in the state, the method applied being the only tax on telephone companies in that state excepting the state license tax of from $10 to $50 on the capital stock of corporations.

Where the gross receipts tax is used as a commutation tax, or as the principal tax, apportionment of the revenues therefrom is usually made to the various local taxation units, as under the tax on capitalization. Maine apportions the receipts to the cities or towns in which holders of the stock of the corporation reside, with some restrictions; Wisconsin apportions 85 per cent. of the taxation revenues to the taxation districts in which the exchanges are located, retaining 15 per cent. for the state.

The other 13 states employing the gross receipts tax, use this method as an additional tax—an "occupation" or special tax. The percentages applied are as follows: South Carolina, three-tenths of one per cent.; New York and Oklahoma, one-half of 1 per cent.; Pennsylvania, eight-tenths of 1 per cent,; Ohio, 1.2 per cent.; Texas, 1½ per cent; New Jersey, Rhode Island and Maryland, 2 per cent.; North Carolina, 2½ per cent.; and 4 per cent. in the District of Columbia.

Virginia varies the system by 1 per cent. on the gross receipts when they do not exceed $50,000 per year and the pole line mileage is less than 400 miles, provided that the company is not controlled by a company with receipts in excess of the amount stated. When any one of the conditions named is not fulfilled, the tax is $2 per mile of poles and 1 per cent. on gross receipts up to $50,000, with 2 per cent. on gross earnings in excess of $50,000. Louisiana adds another variation by taxing foreign companies $5 on each $1,000 of gross receipts, and applies a gross receipts tax to domestic companies which amounts to from $20 to $6,250, according to the amount of the receipts.

Other taxes, besides the gross receipts taxes, are imposed

on telephone companies in the 13 states named, as follows: In ten states, ad valorem taxes on property; in two states, ad valorem taxation on capitalization, and in one state, taxes on both physical property and capitalization.

The laws of practically all the states employing the tax on the gross receipts of telephone companies, provide that the tax shall be paid only on the business within the state, or the proportionate part of interstate business according to line mileage.

The Special Commission on Taxation of Corporations of Connecticut, from the report of which quotations have been made, was created by the general assembly of that state in 1911, for the purpose of studying the taxation of utilities corporations and making recommendations to the state as to the most equitable method for taxing them. The commission reported in January, 1913, after a thorough and exhaustive investigation of the subject, and its report forms one of the most authoritative and comprehensive contributions upon the taxation of utilities that has been produced in some time. As to telephone companies, the commission recommended that such utilities be taxed upon their gross receipts, and fixed the rate at 3¾ per cent., recommending such taxation in lieu of all other taxes excepting the local taxation of real estate.

Concerning this recommendation, the commission said, in part: "The tax on gross earnings is recommended as possessing the advantages of certainty and ease of administration, while also relating the tax burden to the ability of the corporations to pay. Imposed at the rate of 3¾ per cent., it would yield a good revenue and impose a burden approximately equal to the burden of the general property tax on wealth in general. In fixing the rate at 3¾ per cent. due allowance has been made for local taxation of real estate, which should continue as at present."

Further, with respect to this form of taxation, the commission reported: "The tax on gross earnings avoids all the difficulties inherent in the tax or net earnings. No corporation can do business without having accounts which will at least show the amount of its gross earnings. Gross earnings are a definite fact, ascertained by a glance at the accounts, and incapable of argument or difference of opinion. The tax on gross earnings can be evaded only by perjury of the most obvious sort and capable of easy detection. The gross earnings tax, therefore, has the great advantage of simplicity, certainty, and ease of administration. This is an advantage both to the corporation and to the state. The amount of the tax on gross earnings fluctuates with the prosperity or adversity of the business and is, therefore, just to all parties concerned. Moreover, it enters each year into the accounts in a definite ratio, and can thus be counted on in advance."

It should be remembered that this recommendation, both as to the method of taxation and the rate, was decided upon by the commission only after an exhaustive and comprehensive study and investigation of the taxation of utilities corporations, not only in Connecticut, but in all the states. It is, therefore, worthy of serious consideration. It is also a fact that taxation of utilities on gross receipts, as a commutation tax, is very favorably considered by the taxation authorities of a number of other states, and would probably be in use in more states now, were it not for the fact that such a system would have to be authorized by a constitutional amendment.

As to the rate of the tax on gross receipts, the 3¾ per cent. recommended by the Connecticut commission would, figuring in the local real estate tax, amount to an average of about 4 per cent. to 4½ per cent. Throughout the United States, for the year of 1912, the taxes paid by all telephone companies with an income of $5,000 or more amounted to the equivalent of 4.9 per cent. on their gross receipts; in 1907, to 3.6 per cent. on their gross receipts.

Franchise, Privilege and License Taxes.

In a number of states, telephone companies are subject to a nominal franchise, license or privilege tax, sometimes a common tax imposed upon all corporations presumably as a tax or license fee for the right of doing business within the state with corporate privileges. As to their fundamental basis, all of these taxes could be listed under one of the three general heads which have been specified. As to their application, there is a difference in that they are not, strictly speaking, imposed as a measure of general taxation or as a principal tax in any case.

Special taxes of this kind are imposed by 17 states on their incorporated telephone companies, 12 basing the tax on the capital stock and the remaining five applying it in other ways. Five of these states fix a nominal tax, the maximum charge in any of them being $200 per annum, the minimum, $5, according to the amount of the authorized or issued capital stock. One state (Arkansas) charges one-twentieth of 1 per cent. on authorized capital stock, while another (Colorado) charges 2 cents on each $1,000.

The other five states of the 12 applying the tax on capital stock, vary the procedure. Pennsylvania charges five mills on each dollar of actual value of capital stock and four mills on each dollar of bonds owned within the state. Kentucky charges domestic companies doing business entirely without the state, 1 per cent. on authorized capital stock. Texas taxes domestic companies 50 cents on each $1,000 of authorized capital stock and surplus to one million dollars and 25 cents on each $1,000 in excess of that amount, while foreign corporations are assessed on a graduated scale running from $1 on each $1,000 below $100,000 to $2 on each $10,000 in excess of one million dollars. New York charges from ¼ of a mill per dollar for each 1 per cent. of dividends declared to 1½ mills on each dollar of capital stock employed in the state, according to the amount of dividends declared; foreign companies pay a state license fee of ⅛ of 1 per cent. upon the capital stock employed within the state.

In West Virginia, corporations pay a state license tax of from $10 on $5,000 capital stock or less, to $170 if the stock is one million dollars, with an additional fee of $60 for each million or fraction thereof in excess of the first. Foreign telephone corporations pay a state license tax based on toll line mileage.

Of the five states applying the privilege or franchise tax in other ways—that is, not on the capital—Alabama imposes a tax of $1 per mile on toll lines up to 150 miles, with an additional fee of $500 when the mileage exceeds 150 miles. Delaware charges 60 cents per mile for the longest wire in the state; 30 cents per mile for the next longest; 20 cents per mile for every other wire; and 25 cents on each transmitter. In Florida, a telephone company with 100 or more instruments pays a state license tax of 12½ cents on each instrument, provided that the tax shall not exceed $200.

Various privilege taxes are also applied in Mississippi, from $2.50 to $100 on exchanges, according to the number of subscribers, and from 5 cents to 25 cents per mile of line on toll lines, according to the number of miles of such line. Long distance companies operating 1,000 miles or more of line pay a tax of $250. Companies in Mississippi are also subject to municipal privilege taxes. In Tennessee, all telephone companies, excepting those operated mutually and not for profit, are taxed from 20 cents to 50 cents upon each instrument, according to population.

No attempt will be made to describe in any detail the various other peculiarities of state taxation of telephone companies, as applied in the different states. The subject is, at the best, a confusing one, when such comparisons as

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The Building of the Last Link in the Transcontinental Line

The Story of the Construction of the Nevada Section of Line by the Forces of the Pacific Telephone & Telegraph Co., as Related by the General Superintendent of Plant in a Recent Issue of the Pacific Telephone Magazine

By D. P. Fullerton

The story of the building of the Nevada line by the forces of The Pacific Telephone & Telegraph Co. will always be entitled to a page in the history of the telephone. Our "soldiers of the desert" can claim allegiance with "the army of the Nevada line," with equal pride, as Napoleon's soldiers proudly said in their later years that "they were of the army of France."

In the last seven or eight years the feeling gradually developed that transcontinental service would ultimately be a fact. While this feeling was in a good part hope, word came to us at various times that the chances were becoming brighter each day. In the summer of 1911 it was indicated to us that probable routes should be looked into with a view of selecting one over which to build the final connecting link of the transcontinental line. This pioneering was done by Chief Engineer Burkett, General Commercial Superintendent Coolidge, and the writer. Their recommendations were to follow in general a route which would parallel the lines of the Southern Pacific Railway Co. from Reno, Nev., to Wells, Nev., and the line of the Western Pacific Railway from Wells, Nev., to Wendover, Utah.

In 1912 our line was extended from Wadsworth, Nev., to Winnemucca, Nev., one circuit being strung upon the poles of a telegraph company, although at that time it was not at all certain that transcontinental service could be assured. In the latter part of 1913, however, word came that the engineers of the American Telephone & Telegraph Co. felt certain that satisfactory service could be given, and we received word to determine upon a definite route and prepare the necessary estimates, all of which was done.

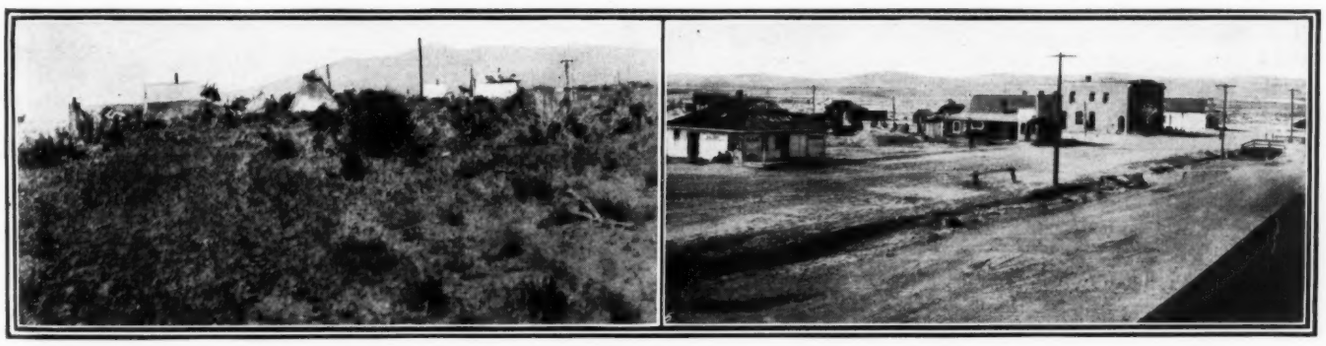
The selection of the route to the meeting place at the Nevada-Utah state line with the lines to be constructed by the Mountain States Telephone & Telegraph Co., was rather difficult to determine, owing to possible obstacles which that company encountered and which we, after conference with their representatives, assisted in determining upon methods to overcome. In planning the construction of the line, many problems had to be carefully considered; the character and type of poles, the most direct route, the rearrangement of existing wires between San Francisco and Reno, the interference from foreign wires, the purchase and delivery of supplies, the housing, feeding, and transportation of men, the exact spacing of transposition and loading points, and purchase of rights of way.

Authorization to begin work was not given until early in January, 1914, although preliminary pioneering and some survey work had been done by the plant engineers of the central division and an organization had been planned in detail by the division superintendent of plant of the central division. Consequently, when the word was given, things began to move. So well had every detail been considered under the plan of organization, that no confusion or lost motion appeared during the entire job.

Three survey crews were put in the field between Wadsworth and Wendover on November 10, 1913. By March 28, 1914, the entire new pole line of 398.3 miles in length, or 13,900 poles, was staked and the location of property lines and owners determined. Following upon the heels of the surveyors were the right-of-way agents, whose work was not only economically but so well done that practically no delay to the construction forces was occasioned. In the meantime, men with teams, automobiles, and tractors were arriving on the ground to prepare to distribute poles and other material.

It might be well to mention that every pole had to be hauled to the stake, for nowhere was the Nevada line built close enough to the railroad to permit of distribution from cars, the requirements being that the line, where possible, should have a separation from all other wires of at least 300 feet, a 1,000-foot separation being preferred. When it is considered that the contractors, who were to furnish the poles, did not begin to cut the trees in the forest until after January 1 and that the logs must then be hauled to the mill, where the poles were to be sawn and then shipped to San Francisco by boat, reloaded on the cars and sent to Nevada, and that we were expected to have the line ready for the engineers' test by July 1, one must realize that speed must necessarily be made. That it was made, is due in a large part to the well selected, organized force which was to do the job.

From the outset it was apparent that if we were to finish the job by the prescribed time, some other means than the digging of holes by hand must be found. After various schemes had been tried, it was found that, with certain modifications determined upon by our construction forces, the Beltz post hole digger could be used for this purpose where soil conditions permitted. Fortunately, exceptionally good digging in general was found. Of the 13,900 holes required for poles, 9,730 were dug by this type of machine, two of these machines being used. But so well did the crews delivering the material and setting poles perform their work, that the



Transcontinental Line Passing Through Indian Village Near Elko, N ev.—Hazen, Nev., on Route of the Transcontinental Line.

men in charge of the hole digging machines had no time to loaf.

These machines dug a hole 16 ins. in diameter and 4 ft. 6 ins. in depth. At times when the soil conditions were exceptionally good, 40 holes were dug in one hour, the holes being located 150 ft. apart; this being one hole and a move of the machine 150 ft. in one and one-half minutes. In one case, one of the machines dug 50 such holes in one hour's time. These, of course, were exceptional cases. The average per machine was 60 holes for a nine-hour day, and the highest day's run was 226 holes in nine hours.

While the pole-setting crew were treading on the heels of the hole diggers and the material distributors, they were just keeping out from under the gang who were "hitting the cedar," for the wire stringing crews were out for records. Considering the character of the country through which they were working, the care with which their work must be done, and the excellent job that resulted, they made records of time and workmanship of which the company may well be proud. The best day's record for the three wire-stringing crews was 52.8 miles, each crew stringing four wires. While this reference is made particularly of the crews engaged in extending the company's lines from Wadsworth, Nev., to Wendover, Utah, the same efficiency was obtained by the crews engaged in the reconstruction of the pole line between Reno and Wadsworth and the taking down of the existing wires between Hazen and Winnemucca and restringing them on the new pole line, and also the crews engaged in the rearrangement and retransposition of wires between Oakland and Reno.

It will be interesting to all to know that the work done in Nevada was under weather conditions that were far from ordinary; similar weather conditions had not been known for the past 30 years. The winter and spring were unusually severe, and the snowfall and rain greater than had ever been known. This meant an unusual amount of water in the streams. Sections of deserts and flats that had been staked over by the survey crews were found to have become lakes when pole and wire crews appeared. Swamps appeared on what had been considered desert land. Even as late as June, some of the work was done on the high ridges when the ground was covered with several inches of snow. At other times and places, it was found necessary to haul water for the men and teams for a distance of 25 miles over several ranges of mountains.

It was necessary to construct roads and on account of the high water in certain sections, a crew was kept busy repairing such roads as existed. Frequently teams were so badly mired in quicksand that those in charge at times contemplated shooting the horses and abandoning the entire outfit, but the never-failing energy and enthusiasm of the men spurred them on to further exertion and such a course was found unnecessary.

While the work of getting water, food, fuel, forage, and supplies to the camps, was difficult, on account of the distance from a base of supplies, the well organized commissary department solved all of these problems to the entire satisfaction of every one. Every effort was made to provide the best possible accommodations for the men and to look after their health and welfare. That this was done is evidenced by the fact that only one case of sickness and two or three minor accidents occurred.

Too much can not be said in the praise of the excellent work of the survey crew, who were the first in the field and who encountered most severe weather conditions. Shelter of any kind is conspicuous by its absence. Wind storms on the sagebrush plains of Nevada are only equaled in their severity by the storms on the Dakota prairies. These men endured all forms of hardship, stuck to the job, and performed the most excellent service. Later in the season, the various construction crews were prevented at times from working, on account of the desert sand storms, and the starting of any work between Truckee and Emigrant Gap before the first of May was prevented by the snows in the Sierra Nevadas.

To provide, in the territory of The Pacific Telephone & Telegraph Co., wires for the purpose of transcontinental service, the following work was necessary:

The regrouping and retransposing of the existing wires between Oakland and Sacramento, a distance of 95 miles, and the building of a new pole line three miles in length in the city of Oakland, whereby the open wires could be brought to the submarine cable landing at the Southern Pacific ferry house on the Oakland side of San Francisco Bay.

The placing of new underground quadded cables through the city of Sacramento, the retransposing of the entire lead of existing wires between Sacramento and Reno, and the stringing of approximately 200 miles of wire between these points.

Reconstructing the pole lead between Reno and Wadsworth, 31.4 miles, placing cross arms and stringing 125 miles of wire; constructing a new pole line, Wadsworth to Wendover, 398.3 miles; stringing four No. 8 copper wires the entire distance and two additional wires between Lovelock and Winnemucca, 71.5 miles; taking down and replacing between Hazen and Winnemucca 240 miles of wire and 4,800 cross arms.

When the construction work started, the transposition specifications had not been completed and consequently not all of the transpositions could be thrown in as the wires were strung. To properly place the 7,540 transpositions necessary, of which 6,032 were physical and 1,508 phantom, 960 were thrown in when stringing wire, 4,062 were cut in, and 2,518 old transpositions were cut out.

In addition to the transposition work, Pupin loading coils were placed at 82 points on the line.

The new pole line constructed in Nevada was built of sawed redwood poles, the dimensions being 4 by 8 ins. top and 8 by 8 ins. butt, 18 ft. in length. The poles had a one-way taper, and came from the mills in Humboldt county, roofed and bored.

The survey work, as previously stated, was started November 10, 1913, and completed March 28, 1914. The actual construction work was started February 13, 1914, and completed June 17, 1914. The work of transposing and loading was started May 2, 1914, and completed at 7:30 p. m. July 28, 1914.

To give an idea of the magnitude of the work, the following notes from the construction records are quoted:

The total weight of material used was 5,500,000 pounds, equivalent to the cargo capacity of the S. S. Beaver of the San Francisco & Portland Steamship Co., or requiring a train of 95 cars, approximately one mile in length, to transport it, the poles alone requiring 61 cars. Of this weight the poles used weighed 3,578,000 pounds; the copper 730,800 pounds; the cross arms, insulators, guy wire, hardware, tools, etc., making up the balance.

In digging the holes for poles and anchors, 47,700 cubic feet earth were removed, which, if piled in a vertical column one foot square, would be nine miles high.

In the actual construction work there was an average of 100 men employed during the construction period, and to feed them it was necessary to serve 49,500 meals.

Of the material required for the job, there were 13,900 poles, 1,800 miles of No. 8 copper, 146 miles of No. 12 copper, 14,000 cross arms, 700 patent anchors, 58,000 bolts of various sizes, 72,000 washers, 56,000 insulators, 90,000 insulator pins.

There were employed on the work 34 wagon, 116 horses, four motor trucks, one tractor of the caterpillar type, and three automobiles.

Inasmuch as all the men engaged in the construction of the Nevada line practically walked across that state, it is estimated that each man walked 1,066,544 steps on the job; that the linemen were required to make 532,000 steps climbing up and down the poles, and that 464,000 turns of the hand were necessary to simply place the insulators on the pins.

Pole Hole-Digging Machine Used in Construction of Line, Largely in Nevada. Machine Has Hole-Digging Capacity for Over a Mile of Line a Day.—Boring in Humboldt Lake, Nev. Eighty Poles (Two Miles) Were Set in Water of Varying Depths.

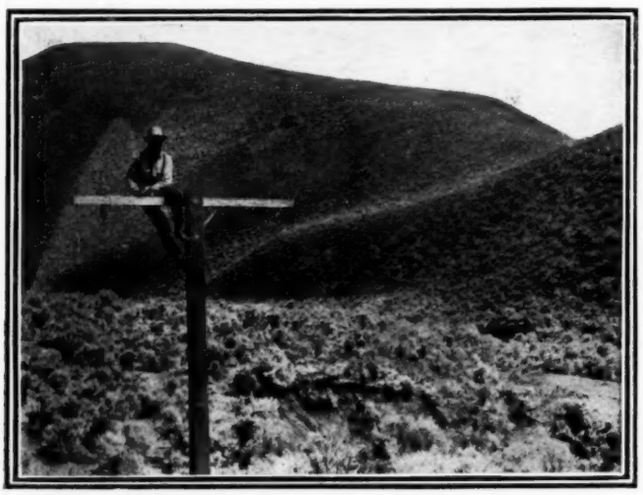
Placing Pole in Position Near Eagle Salt Works, Churchill County, Nev.—Putting up a Pole in a Salt Sink, Near Stone House, Nev., 60 Miles East of Winnemucca. Poles are of Sawed Redwood, 18 Feet in Length, 4 Inches by 8 Inches at Top and 8 Inches Square at Butt.

The Line Near Desert, Nev. Sand and Dust Storm in Background.—Toll Line Crossing Humboldt Flats East of Toy, Nev. Miles of Poles Were Set in Water From 18 Inches to 3 Feet in Depth.

The best day's record in distributing poles from teams by the four gangs so employed, was 600 poles in nine hours' time.

The best day's record for setting poles for the three gangs so employed was 513 poles in nine hours, and for one gang, 285, poles being placed 35 to the mile. This is equivalent to between eight and nine miles of poles erected by one crew in one day.

That the work was well done is demonstrated by the fact



Stringing Wire in Mountainous Section of Nevada, Welch Canyon.

that up to February 1, 1915, there had only occurred one break in the line, and that was due to a defect in the manufacture of the wire. Recent inspection has shown only six or seven poles out of line, which was due to the wind and wave action where the line crosses Humboldt Lake.

The building of the last link of the transcontinental line was delegated to the central division of the plant department of The Pacific Telephone & Telegraph Co.

Many interesting stories could be told of the experiences of the rank and file of the forces engaged in the building of the Nevada line, but the best story that can be told is one of the interest, energy, and good will shown by every man employed on the job. Their enthusiasm was displayed in their every movement and their earnest efforts to co-operate, testified to their pride in having a part in this great undertaking.

U. S. Census Report on Telephones and Telegraphs.

The quinquennial report on telephones, telegraphs, and municipal electric fire alarm and police patrol signaling systems, relating to the calendar year 1912, will soon be given out by Director William J. Harris, of the Bureau of the Census, Department of Commerce. This report, which was prepared under the supervision of William M. Steuart, chief statistician for manufactures, will show that the amount of telephone wire in use in the United States increased from almost 13,000,000 miles in 1907 to more than 20,000,000 miles in 1912, or by about 54 per cent., while the number of miles of commercial telegraph wire, including ocean cable, increased during the same period from over 1,624,000 miles to nearly 1,882,000 miles, or by 15 per cent.

Statistics as to telephone calls are available only for companies having annual incomes of $5.000 or over. Such companies, which in 1912 operated about 94 per cent. of the wire mileage and about 84 per cent. of the telephones, reported for that year approximately 13,735,000,000 calls, an increase of about 32 per cent. over the number (10,400,000,000) reported for 1907. During the same period, the business of the telegraph companies (land, ocean, and wireless combined) increased from approximately 103,949,000 messages to 109,663,000, or by about 5½ per cent.

The capitalization of the telephone companies with incomes of $5,000 or over increased from $758,000,000 in 1907 to $991,000,000 in 1912, or by more than 30 per cent. During the same time the capitalization of the telegraph companies decreased from $253,000,000 to $232,000,000, or by approximately 8 per cent. This decrease, however, was due entirely to a reduction of $23,000,000 in the capitalization of wireless telegraph companies. Excluding the figures for such companies, an increase in capitalization of $2,200,000, or about 1 per cent. is shown.

The net income of the telephone companies with incomes of $5,000 or more increased from $41,200,000 in 1907 to $51,300,000 in 1912, or by nearly 25 per cent., while during the same period the net income of the telegraph companies decreased from $9,650,000 to $6,400,000, or by about one-third.

The number of employes reported by telephone companies with incomes of $5,000 and over, increased from approximately 131,000 in 1907 to 183,000 in 1912, or by over 39 per cent., while during the same period the number of persons employed by telegraph companies rose from 28,000 to 38,000, the rate of increase being nearly 36 per cent.

Predominance of the Bell System.

The Bell telephone system in 1912 controlled nearly 75 per cent. of the total wire mileage and over 58 per cent. of the total number of telephones in use. It also controlled nearly 51 per cent. of the public exchanges maintained by companies with annual incomes of $5,000 or over, and handled 66⅔ per cent. of the calls made over the lines of such companies. The wire mileage of the Bell system increased from 8,947,000 in 1907 to 15,133,000 in 1912, or by more than 69 per cent. During the same time the wire mileage of all other systems combined increased from 4,052,000 to 5,115,000, or about 26 per cent.

The total number of telephones in use (exclusive of railway, governmental, or private telephones not connected with public exchanges) increased from 6,118,000 in 1907 to 8,730,000 in 1912, or by nearly 43 per cent. The telephones under the control of the Bell and of the Independent systems numbered 3,132,000 and 2,986,000, respectively, in 1907 and 5,087,000 and 3,643,000, respectively, in 1912, the percentages of increase being 62 for the former and 22 for the latter. The number of calls handled by the Bell system increased from 6,401,000,000 in 1907 to 9,133,000,000 in 1912, or by nearly 43 per cent., while during the same period the number of calls handled by other companies having annual incomes of $5,000 or over, increased from 3,999,000,000 to 4,602,000,000, or by 15 per cent.

The Bell interests are proportionately strongest in the New England states, where they controlled nearly 93 per cent. of the telephones in 1912, and relatively weakest in the West North Central states (Minnesota, Iowa, Missouri, North and South Dakota, Nebraska, and Kansas), where more than two-thirds of the telephones were operated by the Independents in that year. The largest proportion of telephones operated by non-Bell systems in 1912, 88 per cent., was reported for South Dakota.

The great development of Independent rural telephones systems is indicated by the fact that the total number of systems or lines increased from 22,971 in 1907 to 32,233 in 1912. Of these systems, Bell interests controlled 175 in the earlier year and 176 in the later.

Where Telephones are Most Numerous.

About half the wire mileage and telephones are found in the eight states of New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, and Wisconsin, which together contain about 40 per cent. of the entire population of the United States. The greatest wire mileage for any one state in 1912, 2,790,000, was reported by New York, while Illinois stood second, with 1,689,000 miles, and Pennsylvania third, with 1,600,000 miles. In number of telephones, New York and Illinois again ranked first and second, with 970,000 and 807,000, respectively, while Ohio occupied third place, with 631,000. The

smallest wire mileage, 9,792, and the smallest number of telephones, 5,684 were found in Nevada.

TELEPHONES AND CALLS IN COMPARISON WITH POPULATION.

The number of telephones per 1,000 population in the entire United States, rose from 30 in 1902 to 72 in 1907 and to 91 in 1912. The greatest "telephone density" was found in Iowa, where there were 171 telephones per 1,000 population. California was a close second, with 168, and Nebraska stood third, with 165. The smallest number of telephones per 1,000 population, 21, was found in South Carolina.

The number of messages per capita for the United States as a whole (exclusive of those sent over the lines of campanies having annual incomes of less than $5,000) increased from 65 in 1902 to 122 in 1907 and to 144 in 1912. The greatest number of messages per capita during the later year, 282, was reported from California, while Ohio, with 265, and Michigan, with 240, ranked second and third. North Carolina, with 40, had the smallest number of calls per capita.

TELEGRAPHS.

Some of the more significant statistics relating to telegraphs have already been quoted in comparison with corresponding data referring to telephones. Reports were obtained from 21 land telegraph companies, with 247,500 miles of pole line and 1,814,000 miles of wire (exclusive of wire wholly owned and operated by railroad companies) in 1912. Of the line and wire, 222,000 miles and 1,296,000 miles, respectively, were located along railway lines, and in addition 314,000 miles of wire was wholly owned and operated by railroad companies. The number of messages sent, not including press dispatches, in 1912 was 106,500,000, an increase of 5 per cent. as compared with 1907.

OCEAN CABLE COMPANIES.

There are six ocean cable companies incorporated in the United States, with 83 cable offices and 44,860 miles of cable. These companies handled 2,845,000 messages in 1912, an increase of 20 per cent. over the number for 1907. In addition, the Western Union Telegraph Co. operated 22,800 miles of cable and handled nearly 3,000,000 cable messages in 1912.

WIRELESS TELEGRAPHY.

Between 1907 and 1912 the number of commercial wireless telegraph companies doing business in the United States decreased from 5 to 4, the number of tower stations from 117 to 74, and the capitalization from $32,700,000 to $9,600,000. The number of messages sent, however, increased from 154,617 to 285,091, or by 84.4 per cent; a net deficit of $53,538 in 1907 was changed to a net income of $4,738 in 1912; the number of employes increased from 176 to 958, or by 444 per cent.; and the amount paid in salaries and wages increased from $82,000 to $394,000, or by 380 per cent.

GOVERNMENTAL WIRELESS.

The United States Government maintains 73 wireless stations, a considerable number of which are open for public business. The ships of the Navy are provided with wireless equipment capable of receiving messages without relay at 3,000 miles, and with a sending radius varying from about 400 miles in the daytime to about 1,000 miles at night.

FIRE ALARM AND POLICE PATROL SIGNALING SYSTEMS.

The number of municipal electric fire alarm and police patrol signaling systems increased from 1,157 in 1907 to 1,397 in 1912, or by 20.7 per cent. During the same period, the number of miles of single wire increased from 70,800 to 90,300, or by 27½ per cent.; the number of boxes or signaling stations, from 62,500 to 81,300, or by 30 per cent.; and the number of fire alarms received, from 120,700 to 175,500, or by over 45 per cent.

Annual Reports and Meetings of Telephone Companies

Statements Issued by Telephone Companies in Various Parts of the Country Relative to Their Operations During the Past Year as Compared with the Previous Year—Earnings Show but Little Effect of the War—Publicity Given by Local Papers

Iredell Telephone Co. Holds Annual Meeting.

At the annual meeting of the Iredell Telephone Co., of Statesville, N. C., Secretary W. M. Barringer presented his annual report, which showed that the company has done a fine business during the past year and has earned a net profit of over $5,000.

A resolution was passed increasing the capital stock from $12,000 to $25,000. No dividend was declared, it being decided that the earnings of the company shall be expended in the improvement of the plant and the expansion of its territory.

The plant is valued at $75,000. The company now has in service about 1,600 telephones and has exchanges at Taylorsville, Stony Point, Scotts and Troutman. The old directors were re-elected for the ensuing year, as were also President H. P. Grier and Secretary W. M. Barringer. Mr. Barringer is also manager of the company.

New York Telephone Co.'s Annual Report.

The annual report of the New York Telephone Co. for the year ended December 31, 1914, shows net telephone earnings of $10,159,045, as compared with $11,996,060 for the previous year. The balance available for dividends was $12,715,542, equal to 10.17 per cent. on the $125,000,000 capital stock, against 11.43 per cent. earned in 1913. U. N. Bethell, president of the company, states that the discount of 10 per cent. in telephone rates made pending the appraisal of the company's property by the public service commission has amounted to $1,929,160 for the period beginning February 1 and ended December 31. The income account compares as follows:

	1914.	1913.
Telephone revenue	$47,295,088	$46,831,034
Expenses and taxes	37,136,043	34,834,428
Net telephone earnings	$10,159,045	$11,996,606
Dividends and interest	5,542,073	5,770,397
Miscellaneous earnings	474,622	15,278
Total net earnings	$16,175,741	$17,782,279
Interest charges	3,460,199	3,494,695
Balance	$12,715,542	$14,287,584
Dividends	10,000,000	10,000,000
Surplus	$ 2,715,542	$ 4,287,584

"In submitting the foregoing statements," said President Bethell, "it seems proper to call attention to the fact that although the franchises, rights and privileges owned by your company are assessed and taxed as property, the New York City franchise alone being assessed for the year of this report at $38,878,949, the company has not included any part of the value of such franchises, rights or privileges

in its assets as shown in this report. Neither has it included therein going value, the appreciation in value of real estate or the value of other forms of intangible property.

On December 31, 1914, there were 1,154,905 stations in the system directly operated by your company and its local connecting companies, an increase during the year of 72,140. Including the associated and connecting companies, there were in service in the whole system at the end of the year 2,050,603 stations, an increase during the year of 119,198 stations.

Under the plan for employes' pensions, disability benefits and death benefits there has been paid out from the fund during the past year $260,795. The interest added amounted to $74,990, leaving a balance of $185,805, which has been appropriated to restore the fund to its original amount of $2,000,000."

The statement showed total assets of $253,799,404, including real estate valued at $22,259,426, stocks and bonds worth $82,722,308, and bills receivable of $15,390,628.

Annual Report of Jacksonville (Fla.) Home Telephone Co.

Charles Blum, president of the Home Telephone Co., of Jacksonville, Fla., in his first annual report to the stockholders, stated that the company has more than 3,600 telephones in actual use. He also stated that the company had 1,875 approved subscribers' contracts in the office, and the telephones were being installed at the rate of 25 per day, while the contracts were coming in at a faster rate than installation could be made. The report showed that over $100,000 had been paid out in labor payrolls during the past year, or an average per week of more than $2,000.

President Blum stated further: "Your company is officered and controlled by Jacksonville business men. There are over 400 local stockholders, and with the exception of only about 10 per cent. of the stock, all the stock of your company is owned and held by Jacksonville people. The moneys paid by the people for automatic telephone service furnished by your company, will therefore, remain in Jacksonville, something over $150,000 per year, gradually increased as the number of telephones increase. Your future income will be reinvested in Jacksonville and paid to Jacksonville people as dividends."

The Home Telephone Co. began actual construction work August 27, 1913, the franchise requiring that 1,000 bona fide telephones be in operation within 12 months from August 27, 1914. The plant went into operation August 27, 1914, with approximately 1,300 telephones.

Annual Meeting of Winona Telephone Co., Knox, Ind.

The annual report of the Winona Telephone Co., of Knox, Ind., shows that the company's property is valued at $251,000. The total receipts for the past year were $61,997. The company has about 4,000 telephones in operation in its entire system, which includes Plymouth, Winamac, Knox, Hamlet, Kewanna, Monterey and Grass Creek.

The officers elected for this year are as follows: Samuel Tomlinson, president; A. B. Diggs, vice-president, and W. S. Daniel, secretary and treasurer.

The Providence Telephone Co. Reports Good Year.

The traffic of the Providence Telephone Co., as shown in the annual report to stockholders, at the annual meeting, held recently, has increased considerably during the past year. The total number of stations on the company's system December 31, 1914, was 50,086, an increase for the year of 3,485 telephones, or 7.48 per cent.

The stockholders elected the following directors for the ensuing year: R. G. Hazard, F. H. Peckhan, Dexter B. Potter, Samuel P. Colt, William G. Nightingale, Nelson W. Aldrich, Robert B. Taft, James M. Scott, Howard O. Sturges, H. Martin Brown, Theo. N. Vail, Charles T. Howard and Philip L. Spalding.

The only change in the directorate was the addition of Philip L. Spalding to take the place on the board made vacant by the death of John Sherman last fall.

At a subsequent meeting held by the directors the following officers were elected: President, Dexter B. Potter; vice-president, Fenner H. Peckhan; secretary and treasurer, Charles T. Howard; general manager, Joseph F. Beck; assistant secretary and assistant treasurer, Henry S. Robinson.

Using the Public Telephone in London.

Notices, printed in heavy black type, can now be seen in London and suburban post offices, bearing on the use of the public telephone. Readers are informed that before using a public telephone station in a post office, one must apply to the counter first before trunk line calls are made. The notice also states that two persons may not enter a silence cabinet together or successively for the same fee. The "silence cabinet" is, of course, the telephone booth.

Ohio State to Rebuild Washington Court House Exchange.

The Ohio State Telephone Co., of Columbus, has announced its intention of rehabilitating and extending its Washington Court House exchange during the coming summer. The plan includes new outside construction, new telephones, both city and rural, and new central office equipment, making the plant thoroughly modern.

The work on the outside construction is already completed. The entire plant is of cable, and all cross arms have been eliminated. A considerable portion of it, especially that lying in the business section of the city, is underground.

The central office equipment is to be of the automatic type, and an order has been placed for this apparatus with the Automatic Electric Co., of Chicago. The initial installation will be of 800 city lines capacity, and 45 rural lines operating in connection therewith. A two-position combination toll and information desk will also be installed. Individual and two and four-party service will be available in the city, while the rural lines will be arranged for ten parties each, with semi-selective automatic ringing.

The installation of this equipment eliminates all operators at Washington Court House for local, rural and country service, city to city, city to rural, rural to city and rural to rural, as well as reverting calls on party and rural lines, the operations being made entirely automatically. All subscribers have free county service, and numbers are to be assigned to trunks leading to each of the outlying exchanges. Any patron desiring to call a person in any of these towns, will dial the proper advertised number for that particular exchange. This will connect him direct to the switchboard there, and the operator in the distant exchange will then complete the call.

All toll lines coming into the Washington Court House exchange will terminate at selector switches, as well as at jacks on the toll board. All incoming long distance calls can, therefore, be made automatically, without the help of the Washington Court House operator, or may be routed through her, at the option of the originating operator. That is, if the originating operator uses her dial, the call will go direct to the subscriber's station, while if she uses her ringing key, she will signal the Washington operator, who will automatically extend the call to the station desired.

By reason of the quick busy test and immediate disconnect, and the ability of the originating operator to ring the subscriber direct, the efficiency of the toll lines centering in Washington Court House will be greatly increased and the number of operators required at the toll board reduced to a minimum.

Oranges and Telephones

The Southwestern Home Telephone Co. of Redlands—Municipal Shame

By J. C. Kelsey

The first fruit tree you ever heard of was an apple tree. It was the eating of the fruit of this tree that caused you and your progenitors to toil by the sweat of your brow for all these countless years.

Had it not been for the apple, we would yet be loafing around in Paradise wondering what we could do next to amuse ourselves.

No one ever saw the tree except the original malefactors—possibly they only noticed the fruit. There is a tree in California which is almost as famous as the apple tree. It is the first orange tree. It stands in front of a hotel in Riverside.

It is the father of the millions of commercial orange trees which dot the foothills and sidehills in sunny California. It stands, today, still in life and health, typical of a land where sunshine beams upon man three hundred days in a year.

Speaking of climate, one would think that the Eastern man—accustomed to hustling, paying coal bills, and general nerve-racking business ordeals—would go to Southern California and lie in a hammock on the sunny side of an adobe house, or lazily pick his meal off a tree, tap a milk tree and help himself to honey which the humming bees would deposit at his door. Nothing is farther from the facts.

A man, who comes to this favored country, has to be a hustler; he has to be a worker, and he has to spin. He may have been clever, and even cunning, in his home town, but in this cosmopolitan gathering of the human race, he either becomes super-clever or sinks into mediocrity.

Whatever extravagance of expression he indulges in, however ridiculous his claims, somehow he fails to over-discount what Nature is doing for the country.

Just as in Egypt, which was never a land for an idle man, so is this place no spot at all for a drone. However pleasing the sun is, the fact remains that the country is primarily a pitiless desert land, where the unfortunate victim must have water or die.

Men have to toil. They have to dig. They have to treasure the water, for this land gets only 13 inches, and then all at once. Men have to prune, fertilize, ward off frost, watch for freezes, gather their product, market it and collect their money. You have no more to do in your telephone life.

The only man who can take it easy is the elderly man who has made his money by hard work in your country. He never gets less than 8 per cent. on this money—and usually 12½ per cent.—and no one cries or complains when he forecloses his mortgage.

In this land of 8 per cent. or more, no one thinks of contracting a mortgage with the idea that the mortgage will be renewed. In the land of 5 per cent., the man who forecloses is cursed by the public and censured by the jury.

But, unless you have your money ready or your arrangements made in this land of apparent ease, when that mortgage is due, another man will take up your pruning knife where you left off, and capitalize your lost labor as well as your current improvements.

It is a great melting pot land, not only of every nation in the world, but a great blending of financial standings.

A man with medium means who, at least, pays his bills and entertains slightly, need have no awe of his neighbor who thinks in millions.

A friend of mine had a land deal on with a man he was not sure of; in fact, appearances were against him.

It looked to my friend as if the man was unable to carry out the deal, but a special Dun report showed that the modest man had $40,000,000 to his credit.

California has a reputation for gold, yet the fruit business alone surpasses any gold output known. There are $300,000,000 invested in fruit land. Fifteen thousand growers and their helpers ship 75,000 carloads every year.

It is really a new industry, begun only after the great Santa Fe Railway extended its lines to the Pacific Coast.

In 1769, the Jesuits were expelled from Mexico or Southern California. The fathers emigrated north and, of course, they brought oranges, grapes, figs, olives and kindred fruits. About 1812, Russian traders came from the north and introduced the apple, pear, cherry and that order of temperate zone products.

For many years the industry thrived, yet in 1846, General Fremont reported nothing but ruins of this industry. Naturally it fell to ruin because the railroads had not come to the country.

In 1873, the Southern Pacific system came in and gave the industry a great impetus, but the boom in orange planting did not begin until the Santa Fe Railway pushed its rails across the desert a few years later.

Simultaneous with the Southern Pacific Railway—it hardly would have been possible without it—a couple of new orange trees originating at Bahia, Brazil, were sent to Mrs. L. C. Tibbitts, of Riverside.

It is the Tibbitts family to whom credit is due for giving the California orange its place on your table. Yet, true to all human records, Luther Tibbitts was allowed to die in a poorhouse.

How dangerous it is to do something really helpful to the human race.

Communities with ten-acre fruit or orange ranches naturally cause the growth of cities. One city, in the midst of the orange ranches, is Redlands. Redlands began its municipal existence in March, 1887.

It lies underneath the peaks of the San Bernardino Mountains. It is 1,352 feet above the Pacific Ocean and has a population of 10,000 inhabitants.

It is surrounded by 9,500 acres of full bearing orange trees—an investment of $20,000,000, or about 1/15 of the estimated fruit industry of the state.

A typical ten-acre orchard will cost you from $15,000 to $25,000. The net income from such an orchard under average conditions will range from $2,000 to $2,500. In other words, it is conceded that a fruit grower should get 10 per cent. or more on his investment.

I know one man with a ten-acre ranch, having 685 orange bearing trees, which he values at $40,000, or $60 per tree. He gets from 8,000 to 10,000 boxes of oranges per year and has made as high as $8,000 for the season—never less than $5,000.

He has a beautiful home on the place, and hires every bit

of the work done. No one criticizes him because he earns from 12½ to 20 per cent. of what I call his reproduction value.

I speak of this term, reproduction value, because that is the term applied to public utilities when it comes to a hearing on rate returns. Utilities are usually allowed to earn only upon their reproduction value, less depreciation at the time of the hearing.

Just why some state commissions have not yet learned that private and public property have not the same rights, I cannot understand, unless they do not want to learn it.

Public utility properties are limited by law as to earnings. Private business, unhampered by law and regulation, can easily go through early losses because it can charge enough to get all the money back.

But the public utilities have lean years at the start—real defined early losses—and they have no way of charging enough to make up for these losses unless the state commission voluntarily is generous enough to allow them to capitalize some of these losses.

Today, courts and commissions are still groping and hesitating about allowing public utilities to make up early losses. Surprising, isn't it?

Getting back to Redlands: It is a beautiful city, all that human beings can ask for. It has fine roads, leading to beautiful parks, from whose heights the human eye can see all things that are lovely.

No wonder Edward Everett Hale, looking from Smiley Heights over the city, said: "This is nearer Paradise than I ever expected to get on earth." I could go on and tell you about the beauty and charm of this community until with one accord you would class me with Ananias, Baron Munchausen and other monumental liars of history.

What of the telephone service in such a city? Has it a place in the life of the city?

The railroad had its part in marking the community. The telephone watches the market and the frost. It heralds the approach of enemies, but I do not need to tell all of its virtues.

Is the telephone company fully appreciated? Do the people willingly pay the rates that are asked? And do they appreciate the struggle of the telephone company in their behalf?

Just as the railroads made the country, they are compelled to go on and keep making the country. For their services in building up a great commonwealth, the railroads are asked to pay practically all the taxes of the commonwealth. They are not permitted to take off trains when the losses are so apparent that a blind man can see its need.

And so the telephone company! It came as a long-felt want. It gives the people the most value received. Yet today the company is spending thousands of dollars in preparation to resist a demand made by the people that the rates be reduced.

However, that is along the line of municipal treachery. One cannot wonder why hold-up and violence increase.

A city will welcome a street railway, a telephone system or a lighting system, giving each definite rights upon which to base a system of financing; yet in the next breath, it will let in irresponsible parties; give them the same rights as the old companies; and literally destroy the property of the older companies.

Would H. H. Huntingdon have financed the Los Angeles street railways, discounting the future far beyond his life time, had he known that the city would allow the jitney bus to ruin his work? Hardly.

The history of the telephone situation is typical. The old management of the Pacific or Sunset (Bell) company had no great faith in Southern California.

The people of Redlands were particularly friendly to the Bell interests, but no amount of friendliness nor appeal could force a disposition on the part of the company's management to give them telephone service.

It was then that the Empire Construction Co., of Los Angeles, asked for a franchise, and proceeded to build a system of 350 telephones. The work began in March, 1903, and in February, 1904, the Redlands Home Telephone Co. began its commercial life.

K. C. Wells, a banker and a booster for Redlands, bought the property from the Empire Construction Co. and launched it for the benefit of a public which could never before get telephone service.

In 1905, the Southwestern Home Telephone Co. was organized to develop Riverside county and to connect up what is called "the back country." The home office is in Redlands, and the headquarters are in one of the most artistic buildings of its kind. It consists of red brick, cement and steel and the inside is of the same brick finish as the outside.

The company has exchanges at Redlands, Banning, Beaumont, San Jacinto, Hemet, Armada, Perris, Elsinore, Winchester, Temecular and Idyllweld. It covers a territory of 2,750 square miles and has a telephone for every square. It occupies a strategic position of great value, being the natural gateway to the great Imperial Valley.

In the spring of 1907, Chas. A. Rolfe, who needs no introduction to telephone men, happened to be in Redlands. He naturally took an interest in the telephone situation. Before he knew it, he was, like all Easterners, financially interested.

It was then that the telephone business in Redlands became a real business. Mr. Rolfe's entrance was the turning point in the company's financial and economic life.

In February, 1908, the Home telephone interests absorbed the Bell interests in the territory.

A curious sidelight to this merger of two companies, one with 1,910 and the other with 700 telephones, was that after the merger was completely carried out, not one telephone was gained by the surviving company.

Since 1908, the subscribers' list has increased to 2,900 in spite of the panic of 1907 and its succeeding bad years, followed by the celebrated freeze of 1913.

To give you an idea of the earnings of a California telephone property, the following table will be of interest.

Gross earnings	$78,133
Operating expenses	34,952
Taxes	4,171
Total	$39,123
Net earnings for fixed charges	$39,010

For an average of 2,807 telephones, the income is practically $28 per station; also note that the taxes are higher than yours and average nearly $1.50 per station.

The officers and directors of the company are: K. C. Wells, president; Chas. A. Rolfe, vice-president; A. Gregory, vice-president; J. J. Prendergast, secretary and treasurer; and J. F. Dostal, Henry Fuller, and J. H. Logie, directors.

C. D. Rolfe is superintendent and a study of the company's books shows a record that cannot be excelled. Ernest Irwin is wire chief, and the company claims he is the best wire chief in the United States. Mrs. Bussey is chief operator, and the service of Redlands is her great recommendation. Clarence Rawl is cashier. He can point with pride to losses of less than one-fourth of one per cent. in five years.

Oranges and telephones are a natural combinations.

MORAL: Seeing is believing.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Paul Hamilton

Quiz Questions on the Preceding Installment.

The answer to these questions will be found in the reading section bearing the same number. Answers are not to be sent to TELEPHONY for criticism. For the benefit of those desiring the advantages of a correspondence course, the Engineering Extension Department of the Iowa State College has volunteered to answer questions and criticize replies to questions and solutions of the problems which will be presented from time to time in connection with the course. No charge will be made for this service and the offer applies to all subscribers of TELEPHONY regardless of whether they live in Iowa or elsewhere. Correspondence should be addressed to the Engineering Extension Department, Iowa State College, Ames, Iowa.

54. What is the distinction between the terms "cell" and "battery?"

55. What are the assigned terms by which the elements of a battery are designated?

56. Designate the symbols used for denoting a battery and parts?

57. What are the two theories as to the action of the vitriol type of battery? What becomes of the hydrogen gas in Leclanche cell?

58. How does the dry cell differ from the Leclanche cell?

Problem One.

When Gaines came to Utico, he found a peculiar condition. The Utico exchange, like the immortal Topsy, "had just grow'd up," and the outlying district, a little more than a mile distant, known as South Utico had sprung up as a branch. There were some 600 ground lines in Utico, while South Utico boasted of more than 250 stations. However the South Utico stations were the natural outgrowth of two or three rural lines working out of the Utico exchange. South Utico, to use common phrase of a country editor, had come to be "quite a place," and the people were clamoring for an improvement of conditions in connection with their telephone service.

The pole line running from Utico to South Utico carried five six-pin arms and numerous brackets. The number of parties on a line varied from four to fourteen. The business relations between the two towns was not interdependent. Utico was the center of a farming and dairy country while South Utico could date its very existence to the coal mining and oil industry.

A reasonably satisfactory toll route passed through Utico, but its course was fully a half mile west of the outskirts of South Utico. Toll connections with Utico were still maintained but connections from South Utico were no longer accepted by the toll operating company.

The instruments in use were of an obsolete pattern at both places and were supplied with batteries of the wet cell type. The wire construction was of iron with the exception of a very limited number of lines in Utico which had been given special attention and built of copper.

The board of directors had passed a regular three per cent. quarterly dividend, on the original capitalization of $1,000. To care for the dissatisfactory conditions, they had engaged Gaines in the capacity of general manager under a three-year contract. The president, Mr. Fish, a man of sound business judgment in several lines in which his capital was engaged, admitted that he must relinquish active charge of the telephone enterprise on account of lack of time to devote to it. As none of the local men desired to undertake the task, the small salary, which had been allotted to Mr. Fish for his more or less inefficient services, was considerably increased and Gaines accepted the position.

Before taking the position Gaines assured himself that as there was no reserve fund or undistributed profits, additional capital would be available upon a reasonable representation or demonstration that a satisfactory dividend, say of seven or eight per cent., could be assured. He was also assured that an increase of rates could be expected, especially in South Utico where the uniform rate of one dollar per month was in force. In Utico proper, the few single lines were paying three dollars per month, while the party lines paid one dollar and a dollar and a half.

Outline a reasonable course for Mr. Gaines to follow as regards:

1. The exchange equipment.
2. The instruments and outside construction.
3. Classification for charging for service between Utico and South Utico.

In working out this problem, the principles which apply are to be found in the reading matter presented in the preceding installments of this course. Only a general plan or synopsis, is expected. A model solution to this problem will be presented in TELEPHONY of April 3, so that those working out solutions may have a basis for comparison.

CHAPTER III. Chemcial Sources of Electricity. (Cont'd.)

59. *The chemical action of primary batteries in detail.* While in practical telephony the exact chemical action of battery elements will not be of practical use to the ordinary telephone man, a knowledge is essential to thoroughly comprehend other conditions which result from it. Thus far, but a general outline of the action has been given.

The first mentioned type of common primary cells is called, for reasons which will be apparent, a "gravity"

cell. In this cell the "crow-foot type" of zinc electrode is used, and is suspended just below the surface of the electrolyte. When the cell is set up, the electrolyte separates itself into two distinct solutions—sulphate of copper and sulphate of zinc. Owing to the elements which they surround and their specific gravity, these solutions remain separate, the former at the bottom and the latter at the top, similar to the result of an attempt to mix oil and water. Those experienced in the use of this type of cell undoubtedly have observed that there is a distinct dividing line between the upper and lower portions of the electrolyte, which illustrates this statement that two separate and distinct solutions exist. The upper portion will be transparent or colorless, while the lower portion will have a bluish color.

When the external circuit is closed, hydrogen is liberated and this gas has a tendency to form bubbles upon the surface of the copper plate. In the attempt to reach the copper electrode, it comes into contact with the copper sulphate solution and assists in the formation of sulphuric acid. The sulphuric solution, being lighter than the decomposed fluid in which it is formed, rises to the surface and attacks the zinc electrode, which is suspended near the surface of the electrolyte for that reason. The action described, being dependent upon the principle of gravitation, the name "gravity" is justly applied to this type of cell. The sulphuric solution, upon attacking the zinc electrode, releases ions or atoms, positively charged, which pass to the copper electrode and thence to the external circuit by way of the positive pole.

The action of this cell is so uniform—that is, the hydrogen gas is disposed of to such a large extent—that it is the most suitable type of cell for use where constant current is desired, as in the case of the closed circuit method in telegraphy.

The action of the Leclanche cell is slightly more complicated. Different elements hold different relations to each other, while the ultimate result of their action is the same; i. e., the accumulation of electrical energy. The dictionary tells us that sal-ammoniac is "chloride of ammonium." Chloride pertains to chlorine. This may appear confusing, but the salt family in chemistry is a large one, indeed, and assumes many forms. Chlorine is so classified in this solution.

When action is set up, the electrolyte attacks the zinc electrode, dislodging small particles. In doing so it must expend its potential energy. From observation it is known that decomposition of the sal-ammoniac takes place. Ammonia, a gas, is set free and is absorbed by the water. The hydrogen gas sets off immediately in the direction of the carbon electrode, and if its course were not interrupted, that electrode would speedily become a non-conductor. The walls of the porous cup do not impede its progress. Once through the porous cup, it meets with a contender.

It may be stated that oxygen, like hydrogen, is a gas. In speaking of oxide, or hydro elements, it is to be understood that these gases, as well as others, cannot in all cases be used in their natural state. They must be provided with a harmless and inactive base or carrier, in which they can be accumulated in such a manner that they can be readily extracted. Thus oxide of manganese is a mineral base, highly charged or saturated with oxygen.

The porous cup, as has been said, is filled with oxide of manganese. The purpose of the presence of manganese is to store oxygen. The question at once arises as to why oxygen is required, for it has not been mentioned thus far in connection with the methods of accumulating e.m.f. In this case, however, it serves two very essential purposes: Two parts of hydrogen and one part of oxygen make water. Therefore, when the hydrogen passes through the porous cup, it comes into contact with the oxygen and water is formed. The fluid path for the current is thus maintained. As one part of oxygen is used to two parts of hydrogen to form water, it is safe to assume that more than the necessary portions come into contact as a percentage of hydrogen is known to be left free to collect upon the carbon electrode, eventually forming an insulation against the current.

This Leclanche type of cell, therefore, requires a rest at intervals to recuperate. When the external circuit is closed, the cell is in action and hydrogen is continuously passing through the porous cup to the carbon electrode. When the circuit is broken, action within the cell ceases and hydrogen no longer is liberated. The oxygen, however, is still in store in the manganese and continues to unite with the hydrogen, adhering to the copper electrode until the carbon is clear again and normally ready for use.

The action in a dry cell is very similar, but varies in accordance with the elements employed by various manufacturers. In general, the main features are the same.

In detail, the action which takes place in the secondary cell has a similarity to that of the primary cell, and the difference is worthy of special consideration. The use of the secondary cell, however, is confined to that class of telephone exchanges which will be considered in due order in this course, it being an advanced adaptation of the science.

60. *Local action of primary cells.* While local local as it is called, is of slight consideration in telephone practice in general, the gaining of a clear idea of what it implies is well worth the expended effort. Local action refers to a condition or relation of the elements. This condition usually results from impurities in the elements, or some one of them, brought about in the course of their manufacture, or of foreign elements being introduced into the cell.

As has been stated, different solid elements are affected differently by various solutions. Each element is thus positive or negative to another element to a greater or lesser degree. Assume that elements in one solution or electrolyte have a relation of opposite polarity, while in another they display a similar relation as to polarity, and that a third element displays an opposite relation to either one of them in one of the electrolytes. It is obvious that the introduction of the third element into a cell where the two first elements maintained a proper relation, would set up an action other than that desired between the third element and either one, or both, of the other elements. The use of impure water, having in its composition mineral

substances, will thus cause a local action within the cell and retard its regular action and efficiency to a greater or lesser degree. Likewise, impurities in the zinc or copper electrodes will have an undesired effect.

Sometimes two impurities are introduced which act upon each other irrespective of the regular elements. These conditions are observable from the result of the action of the cell, without the exact knowledge of what the particular nature of the impurities causing the action may be.

In dealing with small primary batteries, an entire change of elements is the most satisfactory method of procedure. In connection with secondary cells, a different method is employed, as will be described later.

61. *Polarization.* Few of us have not heard the term polarization applied. With reference to batteries, it alludes to a condition of one or all of the elements which renders it or them non-conductors to a greater or lesser degree. As has been shown, the natural result of the action of a Leclanche cell is for hydrogen bubbles to collect upon the copper or carbon electrode. The means by which this is overcome have been outlined. In some instances where local action is of sufficient strength, either electrode may become plated or coated with a substance of high resistance and thus its action or conductivity seriously interfered with.

If this state or condition is the result of the proper and natural action of the cell, a rest will have a restoring effect if the polarization is not abnormal. If it results from local action, either the element affected must be purified or new elements substituted.

62. *Internal circuits.* The internal circuit of a cell or battery consists of the path for current through one electrode from its pole, the electrolyte, and the other electrode to its pole. It can be readily seen that the resistance of this circuit must be as small as possible. It appears but a simple proposition to reduce the distance between the proportionately. This is theoretically true, but not practically applicable. The current producing value of the battery is dependent upon the surfaces of the electrodes, as well as upon the fuel supply of the plate to be consumed.

If we take a kerosene lamp with a small bowl and insert a large wick in order to secure additional light, the desired

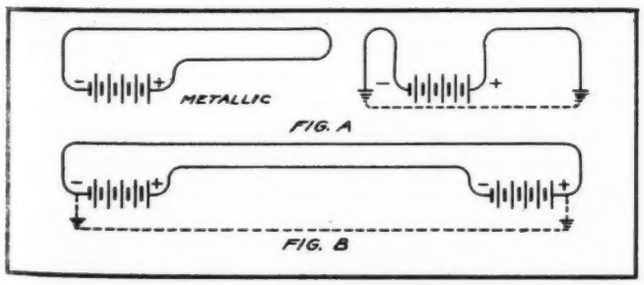


Fig. 15. External Circuits of Primary Batteries.

result will be accomplished but for a limited period. The oil supply must be in proportion to the size of the flame. The same relation holds in regard to the elements of batteries. The electrolyte must be in a quantity proportionate to the electrodes upon which it is to act. Furthermore, as it is constantly in motion, it must have sufficient room to circulate freely between and around the plates. Therefore, a minimum distance must be maintained between the plates. In this case, the minimum and maximum distances are the same. If, then, the proper proportionate relation is established between the elements,

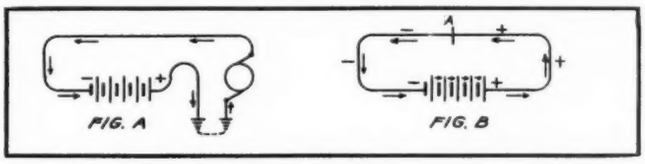


Fig. 16. Intermediate Ground—Direction Determination of Current.

the internal resistance will be the desired minimum and the economical maximum.

The resistance of the electrodes, if unpolarized, does not vary, while the resistance of the electrolyte is in relation to the amount of water contained in it, at a ratio inversely to the proportion of water. As the water is the theoretical base of the sulphuric solution, the maintenance of constant proportionate relation between them is obvious.

It should be remembered that the internal circuit includes all the elements. Thus, when any portion of an electrode is allowed to stand above the electrolyte, it is no longer a part of the circuit, but forms a part of an external circuit. This is only theory, however. In practice, the connecting links between the plates and the portion of the plate leading up to the point of contact with leading wires, called the pole, are included in the internal circuit.

63. *The external circuits.* While a battery has but one internal circuit, it may have a plurality of circuits leading from it. These circuits, called "external circuits," may be of either of two classes—metallic or grounded. In connection with primary batteries, the practice is usually confined to the metallic arrangement; that is, a circuit leading from one pole of the cell, or battery, to the other. This is the practice in the arrangement of door and call bells, enunciators, etc. In telephony, however, the grounded circuit is still extensively used.

In Fig. 15-*A* is shown the radical difference in the two methods. Fig. 15-*B* presents a variation which may be used with either class of circuit. In this scheme the wire leading from the positive pole of one battery connects with the negative pole of another battery. But the positive pole of the second battery must be connected to the negative pole of the first battery to complete the circuit, either by wire or through the ground.

In the instance of a grounded circuit, the earth serves as one side or part. While it can be used in connection with either pole, the general and most satisfactory method is to make it the return portion, as the current flow can be more readily computed in the visible side. If we endeavor to use the current after it has passed through the earth, as shown in Fig. 16-*A*, various difficulties will be encountered which will be described in detail under a separate topic devoted to the earth as a conductor.

64. *The difference of potential.* The exact reason why there should be a difference in potential between two electrodes immersed in an electrolyte is as yet unexplained.

There is also another peculiar relation which is perhaps more readily accounted for. It is that various elements bear a different relation when exposed to different electrolytes. Many metallic elements bear a positive and negative relation to one another. For instance, zinc bears a positive relation to copper in an electrolyte of dilute sulphuric acid, while the copper is negative to zinc. Zinc likewise shows a positive relation to lead in the same electrolyte, but lead will show positive to copper. This may be partially accounted for by the fact that the acid will attack one more readily than the other.

The difference in potential where the external circuit resistance is practically so slight as to deserve no consideration, is more mysterious. It is no doubt attributable to the natural relation existing between positive and negative current. As a result of observations it has been determined that positive current is antagonistic to negative. It is not satisfactorily demonstrated that there is an existing attraction between them, as they never assume opposing directions. This theory is shown in Fig. 16-*B*. As positive and negative currents are determined by the direction of the flow, it is well to understand to what the word "direction" implies or from what point direction is determined. It cannot mean to right or left, or up or down. What it does imply is whether the current is passing from or toward a pole of its source.

In Fig. 16-*B* a battery is shown, the poles of which are connected by an external circuit. The arrows indicate the direction of the current in relation to the whole. If the proper test is applied in the form of an instrument inserted in the external circuit at any point to the right of *A*, it will indicate a flow towards *A* of positive current. If inserted at the left of *A*, it will indicate negative current. In the actual direction of the current, as indicated by the arrows, there is no change. Then the point *A* must be a factor to be considered. An instrument inserted at *A* will display no indication of current passing. This is termed the neutral point in the circuit. It is located, in all cases, at an equal distance from the poles of the battery or source. The distance, however, is not measured in feet or inches, but in ohms of resistance or fractions thereof.

That some mysterious action takes place at this neutral point is evident, but as to what it is we are unable to determine. We say the opposite qualities of electricity neutralize each other. Neutral means a state of inactivity—taking no part—and is applicable in this case as the action of the instrument indicates. If, however, the electricity which comes from the positive pole did not undergo some action at the neutral point—if it were of the same nature after passing that point—it would affect the instrument in the same manner as before it reached there. The current to the left of *A*, however, affects the instrument exactly opposite.

A simple experiment may be performed with a dry battery and a head telephone receiver.

The external circuit should consist of a bare wire. By connecting one side of the receiver to one pole of the battery and then beginning at the other pole of the battery with the other side of the receiver, the neutral point in the circuit can be determined by continuing along the external circuit, making and breaking contact at different points until no sound is heard. After passing the neutral point, no indication of current will be manifest.

The direction of the current, then, is considered in connection with the central point of the external circuit in relation to the poles of the battery. While the general direction of the current is not really changed, if calculated from the central or neutral point, it can be truthfully said that the direction is from or to a pole, as the case may be. *(To be Continued.)*

U. S. Census Figures on Taxes of Telephone Companies.

The five different classes of taxes enumerated in Table 39 of the United States census returns on telephones for 1912, were reported separately for the majority of the companies. Some, however, carried but one tax account and charged to it all taxes paid during the year. The figures are compiled from telephone systems reporting an annual income of $5,000 or more.

The distribution of the total among the five classes for which separate figures are given in this table, was necessarily attended by a certain margin of error. In some cases the taxes on capital stock included taxes which, while computed on outstanding stock, are based on plant, and therefore in reality are taxes on real and personal property, and not on capital stock as such. Similarly, the taxes on earnings include commuted taxes in lieu of taxes on real and personal property, which might very properly be considered taxes on real and personal property. Furthermore, the amounts reported for the different items depend upon the construction given to the laws of the different states. All of these factors must be taken into account in any attempt to determine the amounts of the different kinds of taxes actually paid.

	1912.	1907.	Per cent. of increase.
Taxes, total.....	$12,411,516	$6,213,472	99.8
On real and personal property	7,950,325	3,272,385	143.0
On capital stock.....	1,147,188	778,027	47.4
Federal corporation tax.	459,437	.....	.....
On earnings.....	2,437,078	1,307,957	86.3
Miscellaneous	417,488	855,103	51.2

Taxes Paid by Companies Having Annual Incomes of $5,000.

Annual Meeting of Eastern Pennsylvania Association.

The annual convention of the Eastern Pennsylvania Independent Telephone Association will be held in Harrisburg, Pa., on April 7 and 8. The members of the Eastern association will be joined by the members of the Western Pennsylvania Independent Telephone Association, making it a joint convention.

Tri-State Independent Telephone Convention.

The Tri-State Independent Telephone Association, which comprises the states of Alabama, Tennessee and Mississippi, will hold its eighth annual convention on May 21 and 22 at Memphis, Tenn. Preparations are being made to make it the most notable convention in the association's history.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities and Actions of City Councils Bearing Upon Franchises, Rates and Service

The New York City Telephone Rate Hearings.

The hearings in connection with rates charged in New York City by the New York Telephone Co. have reached their final stages. The joint legislative committee, which was investigating rates, has concluded its hearings and submitted its findings to the legislature. The public service commission has announced a valuation figure upon which it believes fair rates can be based and the New York Telephone Co. has been asked to submit a new schedule of rates for the commission's consideration. In the meantime John L. Swayze, counsel for the company, has intimated that a five cent rate between boroughs will come, "provided the commission meets the company half way."

The majority of the members of the New York Public Service Commission decided on $82,000,000 as a fair valuation on the company's property in New York City for the purpose of fixing a new schedule of rates. It also found that 8 per cent. was a fair rate of return on the capital invested. In deciding upon this percentage, the commission announced that it took into consideration the 4½ per cent. of the company's gross earnings paid to the American Telephone & Telegraph Co. for the use of telephones, which it held was excessive. This charge should be reduced to $1 an instrument, the commission held. This would set $6,560,000 as the net income allowed the company, a reduction of about $3,000,000, which is the reduction proposed by Professor Edward W. Bemis, the expert employed by the legislative committee.

The valuation set by Professor Bemis was $65,000,000, and that set by the company's appraisal committee was $99,934,925. A minority report submitted by Commissioner William Temple Emmet favored a valuation of from $88,000,000 to $90,000,000, which, at an 8 per cent. figure, would yield the company approximately $7,120,000.

Mr. Swayze stated that the directors of the New York Telephone Co. would act on the commission's recommendations. He said that there was nothing in the record to show how much or how little is given for the 4½ per cent. rental which the commission would reduce, or how the valuation of $82,000,000 was arrived at. Previously Mr. Swayze said that a 5-cent rate would come if the commission met the company half way. He said the only thing standing in the way was the varying valuation estimates. If forced to go in the courts, Mr. Swayze said, the company would put up a "hot fight." He stated that the company was opposed to the "establishment of a precedent in arriving at property valuation on the basis used by Professor Bemis, and we cannot permit our property to be undervalued for the simple reason that the stocks and bonds of our company will suffer a severe depreciation."

Professor Bemis' final report to the joint legislative committee did not provide the abolition of all extra tolls between the boroughs. He recommended changes which would reduce the net income of the company from $9,400,000 to $6,400,000. He recommended that individual subscribers, who now pay $48 a year for 600 messages, should obtain business telephones at $42 a year with 840 messages allowed, or residence telephones for $40 a year for 800 messages; that two-party lines be furnished to homes in Manhattan and the Bronx at $36 for 720 messages, and for four-party lines in northern Manhattan, the lower Bronx, Brooklyn, Astoria and Hunter's Point for $30, with 600 calls allowed; that additional messages cost 5 cents each up to 1,200 calls, four cents from 1,200 to 1,800 calls, 3 cents from 1,800 to 3,000 calls and 2½ cents each on calls over that number.

Professor Bemis' recommendations as to rates were adopted by the legislative committee in its report. The committee recommended full power to regulate the telephone business by the public service commission.

"The monopolistic character of the New York Telephone Co. in the state," the report said, "prevents the regulation of charges and maintenance of service by competition; therefore, for the protection of the public it is necessary to give the public service commission greater authority than it now possesses over issues of securities, regulation of rates, supervision of the physical condition of the property, and conduct of the business. Telephone service is developing more and more into a monopoly. Universal service is demanded by the public. If such a monopoly is to be permitted, then it must be subject to rigid supervision and regulation by the state."

The committee recommended that the public service commission be vested with ample authority to compel every telephone line to be constructed and maintained at the standard fixed by the commission. A telephone service should be developed in the state, the committee believed, so that any subscriber—no matter on what line located, or by what company operated—can call and talk to any person in the state having a telephone. This can only be accomplished in the opinion of the committee, by the means of metallic circuits always maintained to a given standard and manned by competent employes, it following, therefore, that this universal service is impossible unless every line be maintained at a standard to be fixed and determined by the public service commission.

It is pointed out that the law vests in the commission authority to require the construction of switch connection, or interchange tracks at a connecting point between two railroads, to compel equal terms of accommodation and to establish through rates and joint rates. The committee recommends that the authority should be extended to include telephone and telegraph lines. Furthermore, according to the committee, the statute should be amended so as to establish a clear, concise and rational definition of a commercial and mutual telephone company. There are a number of short lines, popularly known as farmers' lines, usually unincorporated and not operated for commercial profit. To compel reconstruction of such lines, the committee stated, would be tantamount to their destruction.

The committee recommends that a certificate of public convenience be required from the commission when any telephone line is to be constructed or extended, except for the sole purpose of installing an instrument for a subscriber. Other recommendations are as follows:

Exemption of telephone corporations, having less than $10,000 capital, from supervision, and that regulation should be abolished.

Physical connections between lines of different companies may be ordered by the commission when standards of construction and equipment permit. All telephone corporations and lines should be divided and classified into commercial and mutual corporations and lines. The commission shall not have power to compel any other telephone company or line to connect with a mutual line. In

the case of commercial lines, an exchange of messages can be compelled. If the physical condition of the line be inadequate to permit such connection, the commission shall have authority to require the line to be changed before the connection can be made.

The statute should provide that a commerciad telephone company, a line of which is not more than two miles distant from a telephone line giving a local service, shall be compelled to extend its line and install a station for any person in the state upon payment of a reasonable charge to be fixed by the commission.

All telephone companies, including holding corporations, should be required to report to the commission.

The same control over the issue of stock, bonds and other forms of indebtedness of telephone companies, as is now exercised over the issue of railroad securities, should be vested in the commission.

The commission should have authority to suspend the taking effect of advanced telephone rates pending investigation.

No transfer of stock or physical property of one company to another, or to a holding corporation, should be permitted without the approval of the commission.

The telephone and telegraph bureau of the commission should be enlarged to give the required supervision.

Princeton, Ill., Company Granted New Franchise.

A new franchise was recently granted to the Bureau County Independent Telephone Co., by the Princeton, Ill., city council. The ordinance was adopted at a special meeting and will go into effect immediately upon receiving the signature of the mayor.

The new draft provides that the present rates shall remain in force in Princeton, that the toll rates shall not be changed, that the wires shall be placed underground when deemed necessary by the council and that the poles shall be painted when necessary. It also provides that the company shall pay the city $150 a year, and that the city shall have the right to use the telephone poles under certain conditions for stringing fire and police alarm systems and electric light wires.

The action of the council brings to an end a controversy which has been going on between the telephone company and the council since early last fall. Since the old franchise expired last April, several attempts were made to renew the grant upon the old terms, but met with opposition.

Combined Public Utility Commission Reports Issued.

The combined public utility commission reports are now being issued by the Public Utility Commission Reports Co., with offices in the Stock Exchange Building, Chicago.

These combined reports fill a long felt want in the public utility field. They give the wheat of utility regulation with the chaff removed and furnish the busy utility executive or attorney with the meat of the subject, from a legal, operating and financial standpoint. Yet each decision reported is a certified report and is given in full so that it may be used in practice before courts and commissions.

The direct method of indexing and digesting used by the publishers is said to have been very favorably received. There is no "round robin" indexing, the publishers state, which carries the reader in a circle through a mass of conflicting decisions and comment and brings him back confused and perplexed. Each decision represents the final ruling on the question under consideration.

Through a co-operative agreement with the various commissions, the publishers of these reports receive official copies of decisions and orders of the commissions affecting all public utilities. The decisions are then indexed by public utility experts. Each decision is closely analyzed and all of the salient points are indexed and cross-indexed.

The following are some of the comments upon the reports by well known utility officials:

The official who is responsible for the success of a public utility of any character owes a duty to himself, and to the stockholders of his company, to be provided with vital information contained in these reports.

The executive who directs the management or financing of any public utility cannot afford to be without the data contained in these reports. They will solve for him every intricate problem of management and fortify him to meet all unreasonable complaints, and to resist the constant demand for lower and inadequate rates.

The commission reports are clear and interesting to utility men, as they treat of operating, management, financial and engineering problems and are a veritable encyclopedia of the most advanced thought in modern utility operation. I regard them as absolutely essential to successful utility management.

Hearing on Maryland Telephone Investigation.

At the hearing held last week in the investigation of the property of the Chesapeake & Potomac Telephone Co. in the state of Maryland, Osborne I. Yellott, people's counsel, recommended to the commission the acceptance of the company's book valuation of original costs of property—$171,705. The agreed valuation of the company's land in the city of Baltimore is $93,500, and $65,000 is the agreed valuation of the company's land elsewhere in the state. The agreed building valuation in the state, exclusive of Baltimore city, is $120,800.

Mr. Yellott explained that the figures reached in the conferences were not in the nature of compromises, but were the results of a sort of give-and-take proposition in which each side presented all its facts and figures to the others. As the result of this arrangement the work of the commission will be facilitated by not having to thresh out the huge mass of detail which has been worked out in the conferences.

Court Sustains Company in Removing Subscriber's Set.

Presiding Judge Fricke of the municipal court at Cincinnati, Ohio, rendered a decision recently that will be of interest to the users of telephones. The case was a suit instituted in replevin by the Cincinnati & Suburban Bell Telephone Co. to recover a telephone from George Hussey, of Cincinnati. The company claimed that Hussey had abrogated his contract by talking over the line, for which party service is provided, 40 minutes on one occasion and 19 and 40 minutes at other times. He is said to have conversed with a Ludlow, Ky., woman 40 minutes and to have been warned by the operator.

Hussey claimed that one of the operators had listened to his talk over the telephone, but the operator, who was present, denied this. There was a mass of evidence introduced, and, at the close, Judge Fricke decided the company was acting within its rights and gave judgment accordingly. This is the first case of its kind on record.

Consolidation Planned of Kentucky County Companies.

L. C. Starks, mayor of Hardin, Ky., is initiating a movement looking toward the consolidation of all Independent telephone lines in Marshall county and has made enough progress, it is declared, to believe that he will be successful in the plan. He has effected an agreement with the principal owners of two or three companies, and believes that he will be able to complete organization of the company in the near future. The projected company would be known as the Benton Telephone & Telegraph Co., Benton being the county seat. By a county-wide organization, Mayor Starks believes, the business could be put on

a paying basis and cost of the service to the subscribers reduced.

Protests Against Increase in Assessed Valuation.

Several of the general officers of the Cumberland and the Southern Bell telephone companies recently appeared before the finance, ways and means committee of the Tennessee General Assembly to urge that there be no increase in the assessed valuation or in the rate of taxation which would apply to telephone companies. J. B. Hoxie, of Atlanta, second vice-president; Leland Hume, of Nashville, third vice-president, and E. E. Bawsel, of Nashville, local manager, made statements to the committee, Mr. Hoxie having the principal portion of the statements to make.

He explained that the Cumberland company now pays to the state a privilege tax on every telephone used in Tennessee. The gross taxes each year, he stated, now amount to $32 000, paid on the basis of $50 a telephone in the largest cities, $30 in the towns of medium size and $20 in the rest of the state. In Wisconsin and some other states, he said, the tax is levied on gross earnings and he recommended that this practice be followed in Tennessee. The company, he said, had felt the effects of the depression in the last six months, as had all other enterprises, and would not cheerfully submit to increase in the rates. Were the taxes made heavier, he said, the company would have to decide between reducing the stockholders' dividends or impairing the service, adding that the profits of the company have not been nearly as large as usual, but that the expenses have been every bit as heavy as in previous years.

To Prevent Duplication of Public Utilities in Nebraska.

A bill has been introduced in the Nebraska legislature granting the Nebraska State Railway Commission the power to prevent the duplication of public utilities, such as electric light and telephone companies, in localities where the commission thinks the field is only large enough to support one.

Proposed Compromise Franchise for Spokane, Wash.

Rate regulation by the state public service commission, with a provision for municipal regulation every five years in the event that the rate making is restored to cities of the first class, are provisions of the proposed compromise franchise for the Pacific Telephone & Telegraph Co., at Spokane, Wash., submitted to the city council recently by Mayor C. M. Fassett. The life of the proposed franchise is fixed at 25 years.

Mayor Fassett, who prepared a new draft of the proposed franchise at the request of the city council, made changes in but three sections of the franchise submitted to the people last November.

The first section changed relates to rate regulation and the other to the right of purchase by the city. Section 9, fixing rates, is stricken entirely. Under the former franchise it was provided that the city might exercise its option of purchase every five years, while under the new draft the city is given this right at any time. The manner of conducting the purchase, through the appointment of two arbitrators by either side, and they to appoint a fifth one, is retained. The price fixed is binding upon the company, while the city will have one year in which to determine whether or not to take the property.

The new provision as to rate regulation prepared by Mayor Fassett reads:

"The fixing, regulation, publishing and enforcement of rates and charges for telephone service in the cities in the state of Washington being now within the jurisdiction and power of the Washington Public Service Commission, the grantee hereunder agrees that it will not make or attempt to make any advance in any rate now on file with said commission until a decision is reached in the case now before the commission involving rates and charges for telephone service in the city of Spokane and until the rates and charges for telephone service in the city of Spokane are fixed by said commission and by it ordered to be put in effect.

It is expressly agreed and understood that if and whenever during the life of this franchise the laws of the state of Washington be so amended or changed that the right and power to fix rates for telephone service be given back to cities of the first class. In that event the city council shall have the power, and it shall be its duty, beginning within 60 days of the time of the acquirement of said right by it, and every five years thereafter during the life of this grant, to prescribe by ordinance, after proper hearing, the maximum rates that shall thereafter for five years be charged, exacted and collected for telephone service furnished by the grantee to its patrons within the city of Spokane.

All rates, charges and exactions so fixed by the city council at any time in the future as or when or in the manner herein provided, shall be published, filed and promulgated as the legal, lawful and schedule rates and charges of the grantee. The grantee shall comply with all the provisions of the law relating to publication of its rates or the filing thereof with the public service commission or other regulative body."

Intercommunicating P. B. X. for Kentucky Courthouse.

The Fiscal Court of Jefferson county, Ky., is considering a proposition to install an intercommunicating branch exchange in the courthouse, with 19 stations, and from four to six trunk lines. The proposition has been made to the court, which administers the affairs of the county, by W. B. Fisher, manager of the Home Telephone Co., Louisville, Ky. Mr. Fisher showed that, even with the two switchboard operators who would be required were the installations made, the service on this basis would be cheaper than with the individual systems now in use.

Bill Prohibiting Discriminatory Charges in Indiana.

Representative Bendel, of Huntington, Ind., has introduced a bill in the Indiana legislature that would put a stop to the practice of many public service companies of giving one rate to one customer and another rate to another customer for the same kind of service. The Bendel bill prohibits such discrimination and provides that a fine be imposed upon any company violating it. It also makes any officer or agent of such company that practices discrimination liable to a fine and a year's imprisonment.

Sanitary Mouthpieces for Public Telephones in Texas.

Representative Sullivan has introduced a bill in the Texas legislature requiring all telephone companies to equip their public telephones with sanitary mouthpieces.

To Prohibit Public Utilities From Requiring Deposits.

Representative Cleary, of Marion county, Ind., has introduced in the house of the Indiana legislature, a bill prohibiting public utility companies from exacting a deposit before service is furnished.

Bill for Municipal Control of Telephones in Iowa.

A bill has been introduced in the Iowa General Assembly which will give municipalities control of telephone companies. This bill was indorsed in a resolution recently passed by the Keokuk, Iowa, city council.

Bill Providing for Reduction in Rates in Omaha, Neb.

Senator Bedford has introduced a bill in the Nebraska legislature providing that the telephone rates in Omaha be reduced not more than 85 per cent. of the present charges. It also provides that within 30 days after the passage of the measure a complete schedule of rates must be filed with the Nebraska State Railway Commission.

Telephone Bills in Wisconsin Legislature.

Two bills affecting telephone companies recently were introduced in the Wisconsin legislature by Senator Weissleder, of Milwaukee, and have been referred to the committee on corporations of the senate. One, relating to advance charges by telephone companies, reads in substance as follows:

"No person, firm or corporation operating any plant or equipment for the conveyance of telephone messages, to or for the public, shall demand, collect or require the payment of any charge, toll or rental for the use of any telephone instrument or other part or portion of such plant or equipment used in the conveyance of telephone messages, or in connection therewith, or for any connection with the central office or exchange, or for any service in the conveyance of telephone messages, for more than one calendar month in advance of such use or of the rendering or furnishing of any such service."

The penalty is fixed at $10 to $100 for each violation.

The other bill, relating to telephone slugs, reads:

"Any person in whose residence, place of business or premises any 'nickel telephone' or 'prepaid telephone' instrument is installed, may drop or deposit metal objects, other than nickels and commonly called 'slugs,' in such telephone instrument as prepayment for the securing of telephonic service. At such times as coins and slugs are removed from any such telephone instrument, the person in whose residence, place of business or premises the telephone instrument is installed shall pay to the person, firm or corporation furnishing such telephonic service a sum of money equal to the regular charges for the services secured by the use of such slugs. Upon making payment therefor, as herein provided, all slugs dropped or deposited in such telephone instrument shall be retained by or turned over to the person charged with and making such payment."

To Regulate Inductive Interferences in Wisconsin.

Representatives of the electric power companies and telephone companies operating in Wisconsin met recently at Madison, following an afternoon hearing before the Assembly committee on transportation, and agreed upon a substitute amendment to the Frederick bill conferring power on the state railroad commission to regulate interferences with telephone or telegraph service resulting from electric power transmission lines.

The new amendment, upon which all agreed, including Assemblyman Frederick and the Assembly committee on transportation, provides that the railroad commission shall have power to regulate interferences between telephone or telegraph service and electric power service which may result from the construction of telephone, telegraph or electric power transmission lines along public highways or private rights-of-way; that the commission shall have power to regulate the construction of telephone, telegraph and high tension electric power transmission lines, so as to make them reasonably safe, and that it may require changes in construction and methods of operation wherever public safety requires such changes.

Summary of State Commission Hearings and Rulings.

ARIZONA.

February: Application filed by the Mountain States Telephone & Telegraph Co. for permission to sell its exchange at Winkleman, Ariz., to the firm of Minor & Grasty.

CALIFORNIA.

February 8: In the complaint of the Hugheson (Cal.) Telephone Co. vs. the Pacific Telephone & Telegraph Co., the complainant alleges that the defendant has violated a territorial agreement entered into with the Pacific company by serving residents within complainant's territory. The commission held that as complainant's exchange is located at Hugheson, with additional charges for Modesto exchange service, it could not compel such subscribers to accept Hugheson exchange service in lieu of the more desirable Modesto service. The complaint was accordingly dismissed.

February 8: Application of Pacific Telephone & Telegraph Co. for permission to install a telephone plant, and to publish, file and put into effect rates for exchange and inter-exchange service at San Bruno, San Mateo county, Cal., granted, provided that this permission is not to be taken as approval of the rates for exchange service, since the commission has not passed upon their reasonableness.

ILLINOIS.

February 24: Mutual Telephone Co., of Madison county, authorized to discontinue discrimination and charge a flat rate of $12 per year to all subscribers. Heretofore some stockholders have been charged a rate of $6 and others $8, while the general public paid $12.

INDIANA.

February 24: Hearing on application of the Monroeville (Ind.) Home Telephone Co. for permission to increase its exchange and toll rates.

KANSAS.

February 24: Application of W. P. Hemphill, of Kansas City, the Kansas City Long Distance Telephone Co. and the Missouri & Kansas Telephone Co. for the consolidation of the two exchanges at Ottawa, Kans., and the organization of the Kansas Telephone Co. by Mr. Hemphill. As specified in the application, the Kansas Telephone Co. would have a capital stock of $150,000 and be permitted to make a bond issue of $750,000. The application calls for an issuance of $61,000 in bonds for the Kansas City Long Distance Telephone Co. and $50,000 for the Missouri & Kansas company, to pay for their respective Ottawa properties.

March 9: Hearing on application of the Missouri & Kansas Telephone Co. for permission to increase rates at Parsons.

MARYLAND.

March 10: Hearing on investigation of the rules and practices of the Chesapeake & Potomac Telephone Co., in Maryland.

MISSOURI.

February 20: Sale of the Weston (Mo.) Telephone System by Julius Rumpel to C. C. Layton for the sum of $20,000, approved.

February 27: Sale of the Doniphan (Mo.) Telephone Co. to R. H. Heitland and C. Kind for the sum of $8,000, approved.

NEBRASKA.

February: Western Nebraska Telephone Co., of Harrison, Neb., authorized to increase its business rate from $1 to $2 a month and to increase its rate on residence and farm telephones from $1 to $1.50 a month.

February: Informal complaint filed by the Kearney (Neb.) Telephone Co. against the Nebraska Telephone Co., alleging that the Nebraska company refuses to connect with the Kearney company at Kearney when messages from the latter place are destined to territory that is occupied exclusively by the Nebraska company.

NEW YORK.

March 5: Hearing on complaint of Daniel Edwards, the city of Johnstown, N. Y., and Nathan D. Griffin against the Glen Telephone Co., as to toll charges between Johnstown and Gloversville and proposed general rates.

OHIO.

February 23: Lima (Ohio) Telephone & Telegraph Co. granted authority to issue $32,500 common capital stock and $32,500 cumulative preferred capital stock.

WASHINGTON.

May 15: Hearing on the valuation of the properties of the Pacific Telephone & Telegraph Co. in the state of Washington. On the valuation to be fixed, as a result of this hearing, telephone rates, both for exchange and toll service, will be based for all parts of the country.

WISCONSIN.

March 3: Order directing continuance of physical connection between the Belmont & Pleasant View Telephone Co. and the Lafayette County Telephone Co., the Belmont Co. to pay the Lafayette Co. $30 annually for the service, and the arrangement to be effective April 1.

Practical Subjects—Letters and Discussions

Lines From a Minnesota Lineman.

By Well Clay.

The snow lies deep in a cold white shroud
And the winter winds unending,
Blow their frozen breath and shriek aloud
While old 'phones I am mending.

The window panes are white with frost,
The lake with ice is sheeted.
I'm glad in spite of all it costs
Our exchange with steam is heated.

The hedge is bare, the birds are gone,
The flowers rest in their erstwhile tomb,
Old Boreas doth reign supreme;
And our rooster froze his comb.

With squeakings loud the farmers' sleds
Doth slowly pass our door;
One of our pigs has up and died,
Which it never did before.

We have been busy in the back shop today mending up old telephones and getting the shop in order. Meanwhile I have been digesting Friend Kelsey's million dollar scheme for putting a little pepsin into the digestive apparatus of the telephone securities' market and have concluded that it is a big proposition dealing more with psychological than with physical conditons. But as Kelsey is that kind of a fellow, I think the reputation of telephone securities can be changed as that is all the thing will amount to or that will be necessary. In the meantime, as we do not need the doctor up in this neck-o-woods—seeing that we finance our companies at home without help or trouble—I have concluded to let that end of the game rest while I figure out a few more ways of keeping account of costs, to the end that I may establish some standards for my own guidance when I undertake a new piece of work. I hope any of the other boys who have figured out a good thing in this line will let us have it through the columns of TELEPHONY, for I want to get more of them.

I am sending you four cards, three of which I have used with excellent results for two or three years. In explanation, I will say that my judgment in the matter was influenced considerably by the well known fact that the ordinary lineman "hates like sin" to write anything in the nature of a report if he can possibly avoid it.

Therefore a card was figured out which reduced the necessity for written explanation to a minimum and which gave the desired information by means of punch marks. (By the way, linemen like to punch tickets. I do not know why, but they sure do).

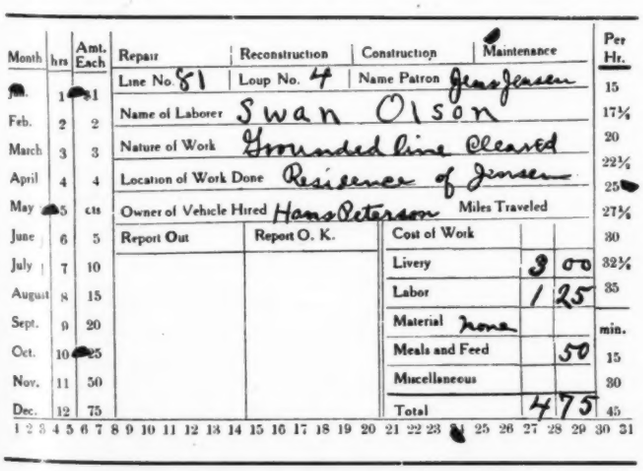

Month
hrs
Amt. Each
Repair
Reconstruction
Construction
Maintenance
Per Hr.
Line No. 81
Loup No. 4
Name Patron Jens Jensen
Name of Laborer Swan Olson
Nature of Work Grounded line cleared
Location of Work Done Residence of Jensen
Owner of Vehicle Hired Hans Peterson
Miles Traveled
Report Out
Report O. K.
Cost of Work
Livery 3 00
Labor 1 25
Material None
Meals and Feed 50
Miscellaneous
Total 4 75
Jan. Feb. March April May June July August Sept. Oct. Nov. Dec.
15 17½ 20 22½ 25 27½ 30 32½ 35 min. 15 30 45
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Fig. 1. Record of Line Work Done and Its Cost.

I selected a size of card which fitted the standard size drawer of filing cabinets so that in case the system developed, as I hoped that it would, there would be no confusion and extra expense on account of having several sizes of cards. Different colors would help some but I have not proceeded that far yet.

Size being settled, I made out, after much study and the trying of many forms, the card you see here as Fig. 1. The reason for taking so much time on the first was because it was to be the basis for all of the rest.

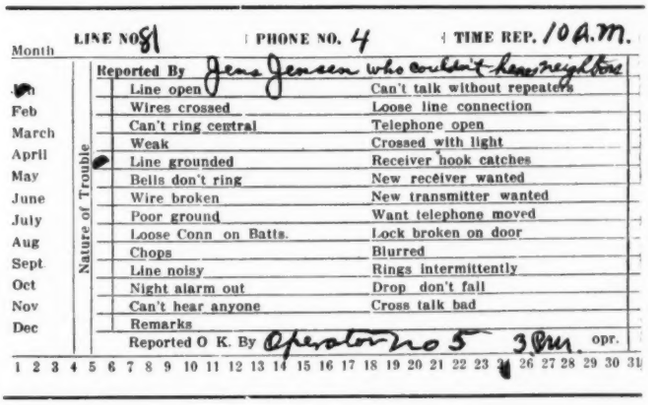


Fig. 2. Trouble Record Card.

The day of the month, and the number of hours worked, are provided for in the two columns on the left and the line of figures along the bottom. The price per hour and the figures for odd minutes below the hour appear in the column on the right. On the top are the four different accounts to which ordinary work is to be charged, viz.: repair, reconstruction, construction and maintenance. These you can change to suit yourself or the dictates of your public utility board. The line number and telephone number, if card is used in connection with a party line, are on the line below the top line, followed by the name of the laborer, the nature of the work performed, the name of owner of vehicle if one be hired, and the number of miles traveled. A box heading for convenience in recapitulating the different items in shape so that a total of the amounts may be made by the bookkeeper, is printed on one end.

When this card is turned in, it serves as a report of work done and also as to what it cost. It shows when and where, and is a fine check on carelessness in accounting, but is not very popular with the time killer, as you might imagine. Then, too, if a lineman forgets and puts down time spent in a fishing trip on the side as something else, he must not only have a fine imagination but must be backed up by the girl at central, for his ticket must check with the trouble ticket, if it is a case of trouble.

The second ticket, Fig. 2, is of the same size as the other. It has many of its chief characteristics as, for instance, it is mostly made out with a punch to avoid any confusion as to dates for many times a stamping machine with a dry ribbon will not make a satisfactory, legible record of a date.

The cases of trouble listed are those, of course, which occur the most frequently. In case detailed costs of different departments or of expenses of each station are being kept, all one has to do is to file these tickets away, without any further bookkeeping, in the compartment of the drawer numbered concurrently with the station or piece of work to which they pertain. The linemen's ticket can be used in the same manner or can be filed in drawers by months under the headings which appear on the top line.

The vehicle ticket, Fig. 3, which the lineman makes out, serves as a sort of a time check, so to speak. If it is desirable where vehicles are hired the tickets can be cashed in by the liveryman, or other owner, without the trouble of making out an itemized bill. If he is slow about getting his bill in, the lineman can make out a duplicate each time and a check

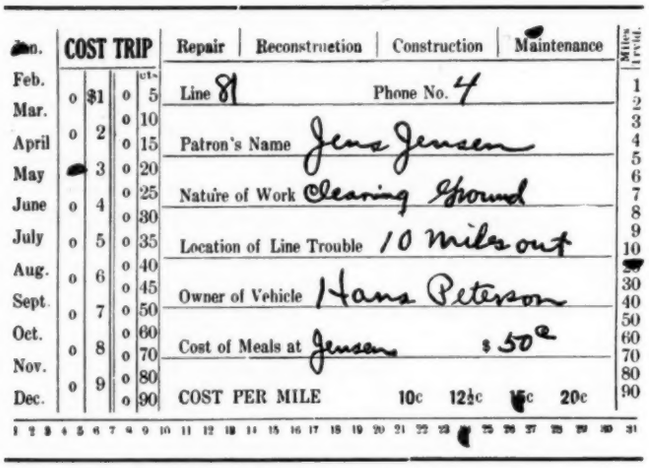


Fig. 3. Vehicle Time Ticket.

may be sent him promptly, if accounts are paid that way, whether he puts in a bill or not.

A form of message ticket is shown in Fig. 4. It can be used in case the office is too small for a calculagraph or too large for a smaller stamping machine which depends on a ribbon feed. The only thing about this is that I have not had time to invent a clock that will crimp a line along the elapsed time part, to show the duration of the message, but have to depend upon the punch the same as with the other tickets.

An outfit like this, one can get printed at home. All it will cost in addition to the printing will be 25 cents for a punch,

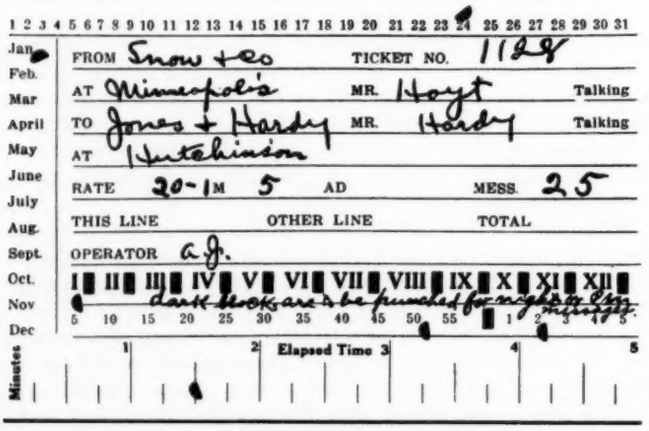


Fig. 4. A Form of Message Ticket for Small Offices.

as the forms are not copyrighted. You are welcome to wade in and see how much it is costing you to take care of certain lines of your maintenance work or the cost of a new loup.

Moral: Harvest your statistics in time.

Cumberland Subscribers Encouraged to Report Trouble.

The Cumberland Telephone & Telegraph Co. is paying a large amount of attention just at this time to perfecting the physical condition of its wires in the interest of good service. In the current advertising of the company in Louisville, Ky., papers, subscribers are urged to report immediately when their telephones seem to be working poorly. "When your telephone is not working as it should, or if you feel that your service is not just right," reads the ad. "don't wait until your telephone is entirely out. Call 'Complaint' at once and tell the man your trouble. You will be answered courteously and your trouble will be remedied as quickly as possible. Always call by number, not by name."

The last directory distributed in Louisville was dated December 15 and the name "Complaint" does not show in it, though it will be in the forthcoming issue, which is due soon. Meanwhile the subscribers are referred to "Information" for the number in question. In the same connection, the bills which are sent out to the Louisville subscribers are accompanied by notices which call attention to the fact that no instruments or apparatus other than that furnished by the company may be used in connection with the Bell service.

The Iowa Independent Telephone Convention.

The nineteenth annual convention of the Iowa Independent Telephone Association will be held at the Chamberlain Hotel, Des Moines, Iowa, March 9, 10 and 11. In conjunction with the convention, the Department of Engineering Extension of the Iowa State College will conduct two schools.

The operators' school, which will extend over a period of four days, March 9, 10, 11 and 12, will be in charge of Miss K. M. Gang. Miss Gang has had a wide experience both as operator, chief operator and instructor in operating methods, and during the past month or so has conducted operators' schools at Washington, Creston and Sac City, Iowa. The general plan contemplates that three days be given quite largely to local operating methods, phrases, voice control, cord and key handling, etc., and that the fourth day be especially devoted to long distance methods, including signaling, phrases, testing circuit, recording, passing and receiving tickets and the official code.

The other school is for telephone plant men and will include a three days' session, March 9, 10 and 11. At the Tuesday morning session line construction and circuits will be taken up. Parts and models will be used for illustration in the class room and material will be on hand to enable the student to wire up the various circuits. The afternoon session will convene at 1:30, at which the subscriber's instrument will be dealt with. The details of construction and operation will be explained, and tracing and elimination of trouble will also be taken up.

The Wednesday morning session will deal with the structure and manufacture of cable. Special equipment will be provided to allow students to practice in splicing and wiping joints. The afternoon session will be devoted to the switchboard and terminal room. The use of instruments in testing and locating troubles will be explained and demonstrated at the Thursday morning session. The afternoon session will be open for discussion or for instruction in subjects called for.

Both of these schools, as well as the convention meetings proper, will be held on the parlor floor of the hotel.

One of the important subjects for consideration at the convention sessions is the accounting system as prescribed by the Interstate Commerce Commission. Other important topics will have a place on the program, including the pending telephone legislation.

The convention promises to be interesting, as well as instructive, and managers are urged to have their operators, troublemen and other employes attend.

North Dakota Independents to Hold Convention.

The North Dakota Independent Telephone Association will hold its ninth annual convention at Grand Forks, N. D., on March 24 and 25. The complete program will be announced later.

Local Telephone Operating Rules and How Developed

A Serial Story Dealing with Local Operating Terms and Rules—Reasons for Their Use—A Real Study of Rules Beginning with Fundamentals and Developing All Essential Factors in Operating Room Practice, for Both Small and Large Exchanges

By Paul Hamilton

The assembly at Rock Ridge made an early disposal of the matter relative to the next meeting place, and the responsibility of conducting the proceedings of the next conference devolved upon "Mr. Burke, of Florida."

"And other places," Mr. Carney remarked. "Speech!"

"Carney is setting up a dangerous precedent," Mr. Prince cautioned, "as most of us are not endowed with the oratorical ability of our friend Burke."

"It is customary for a person upon whom honor is conferred to express his feelings," Miss Sible advised.

"Oh, that is a different thing," responded the genial Mr. Burke. "I can do that, I believe. I think I feel, or did feel, something the same as the good colored brother I was telling you about the other day. At one of the evening prayer meetings the parson insisted that each member should pray for exactly what he or she wanted most. The brother on the last seat waited attentively for his turn, and was finally called upon to offer up his supplication.

"'Well, pahson,' he said, ''tain't no use for me to pray dis yere night. I'se been as much interested in the prayers of the brethren as the Lawd hisself. But, recollect, pahson, I'se mighty lame wid rumatiz dis yere wedder, an' 'ginst I gets 'round to Majah Frye's hen coop, even if de good Lawd does answer all de prayers and kills de Majah's dawg fo'teen different ways, dey wouldn't be even a featha lef' for me. So I guess 'tain't much use no how for me to say nothin' to de Lawd about it.'

"I was hoping that all the questions would be settled before you all decided to come to Florida again, and there wouldn't be any use of a meeting there."

"That may be the way you felt, but that does not express the emotions of having the honor unexpectedly thrust upon you," Miss Sible persisted.

"Well, then, to satisfy anyone's particular curiosity, I feel like the man who received information that his wife's cousin with his family of twelve was coming to pay him an extended visit," Mr. Burke rejoined.

"'Oh, my land,' his wife exclaimed, 'and what did you tell him?'

"'Wal',' said the man, 'I told him the bacon had all molded in the smoking; the merlasses had turned sour in the barrel; weevils had got into the wheat; the cow, for some reason or other, was giving bitter milk; that there was scarlet fever both sides of us, and mad dogs jest over the ridge to the east; that I didn't know jest how we'd manage, but barrin' them little inconveniences they was welcome.'

"I won't go into detail as to what conditions may be in Florida two weeks hence, but barrin' future developments, you all are perfectly welcome!"

"Well, where did we leave off?" Mr. Telson inquired.

"If my memory serves me correctly, we finished telling the operator she should report for duty once in a while and stay to suit her convenience," Mr. Burke replied.

"As we have outlined under what conditions she is supposed to report, suppose we give her an idea of circumstances under which she must not report," Mr. Carney suggested.

"I can recall none such," Mr. Prince observed.

"Well, in case an operator has been exposed to a contagious disease—she should not come to the exchange without some assurance being offered that she is immune from spreading the contagion," Mr. Carney argued.

"I agree that that should be made emphatic," said Miss Sible.

"It appears to me that none of us will disagree on the point in question," said the chairman.

"'Operators having knowledge of having been exposed to contagious diseases, will not be permitted to report for duty until satisfactory assurance can be given that there is no danger of spreading the disease,'" Mr. Carney outlined the statement.

"That is good, as far as it goes, but suppose the exposure is without her knowledge," Mr. Prince suggested, "and she has exposed the other members of the force before anyone becomes aware of it. That is a condition that most frequently occurs."

"In that case we may add that each member of the force must submit to whatever treatment the management or health officers decide to be necessary to prevent further contagion," Mr. Carney advised.

"Submit to general renovation, in plain words," observed Mr. Burke.

"Some people object to being treated by other than their own family physicians," remarked Mr. Jackson. "I do, at least."

"If the treatment decided upon can be administered by the family physician there should be no objection to accepting a certificate from him to the effect that the requirements have been complied with," Mr. Prince answered.

"I think the operators should be advised to take due precaution against becoming exposed to contagion of any nature, but if it is found that disease germs have been brought into the exchange unconsciously, all operators should submit to such rules as are considered most advisable by the management to suit the occasion, both for her own welfare and that of the public at large," was Miss Sible's comment.

"If it is necessary to use a disinfectant in the operating room for a time, it may afford an inconvenience to every one, but as business must go on just the same," argued Mr. Burke, "I don't see any escape for her."

"We might say," that gentleman continued, "'Operators are cautioned against becoming exposed to contagion of any nature, but if it is found that unavoidable exposure has resulted in the general exposure of the operating force, all must conform to any special rules or requirements decided upon as advisable by the management.'"

"That expresses the idea, I believe," said Mr. Carney.

"I think that paragraph should precede the other," observed Mr. Telson.

"Read the two in that order, Burke, if you please," Mr. Prince requested.

"'Operators are cautioned against becoming exposed to contagious diseases of any nature, but if it is found that unavoidable exposure has resulted in the general exposure of the operating force, all must conform to any special rules or requirements decided upon as advisable by the management.

"'Operators having knowledge of having been exposed to contagious diseases will not be permitted to report for

duty until satisfactory assurance can be given that there is no danger of spreading the disease.'"

"How about breaking quarantine?" questioned Miss Floyd.

"Who ever heard of such a thing?" said Miss Sible.

"I have, and more than that, I have done just that myself. I am not anxious to have anyone else get into the trouble I did, if I can assist them in avoiding it," Miss Floyd replied.

"I don't understand," said Mr. Telson. "If anyone is quarantined, it is the duty of the proper officials to enforce the rules."

"That may be the understanding and it is easily carried out where there is only one house or so included. What I refer to is where a district is included and where only a very small percentage of the people in it are known to have been exposed. That was the case where I worked. Our house was on the very edge of the territory included and I thought nothing of going out through the alley crossing between two buildings and coming out on a street not included, as if I came from one of the houses on that street," continued Miss Floyd.

"What should you have done if you desired to continue at work and not get into trouble?" Mr. Burke inquired.

"Well, I suppose I should have gone to the proper authorities, secured a health certificate and removed my belongings to some other part of town," Miss Floyd responded.

"In that case operators residing within the limits of a quarantined district should move to another location after having secured a certificate from the proper authorities," advised Mr. Carney.

"At any rate, she should not report for duty while she continues to reside in a quarantined district," Miss Floyd replied.

"Such instances are few and far between, I think," Mr. Prince remarked.

"But so important when they do arise that a few words along that line will not be entirely wasted," Miss Floyd maintained.

"In other words," said Mr. Burke, "'Operators residing in districts under quarantine will not be permitted to continue on duty until they have complied with the requirements of the proper authorities, and removed beyond the limits of the district.'"

"It might be added that the management will not become a party to any attempt to evade lawful quarantine regulations," said Mr. Carney.

"That is making it forceful enough, surely," Mr. Prince remarked.

"If that is all on that topic, where shall we begin now?" Mr. Telson inquired.

"It occurs to me that you all might be interested in an observation that came to me at Princeville the last time I was there," said Mr. Burke. "Carney was out of town and that may account for it. He not being on hand, as he should have been, I was forced to loaf around and amuse myself as best I could until the five o'clock train came along—and it was an hour late."

"No wonder, if Mr. Carney wasn't there," Miss Sible remarked.

"Well, I wandered from livery stable to post office, and from drug store to the depot. Finally, word got abroad generally that the train would be along soon, and the clans began to gather. Just before the train came in, a group of three or four young ladies came rollicking down the street in high spirits, judging from the noise they made.

"'Oh, let's wait for the train! I haven't seen a train come in for an age,' one of them exclaimed. And up the platform they came, not exactly boisterously but hilariously, to say the least. They pushed through the crowd, but paid no heed to anyone in particular, attending strictly to their own business, which was having a good time. As they passed near where I was standing, I heard someone remark:

"'That's that bunch of telephone girls. Aren't they the limit?'"

"And, after all Mr. Carney's care in selecting operators, too," Miss Floyd remarked.

"I don't know whether to believe it or not," Miss Sible observed.

"He doesn't let them go down to the depot often enough," commented Mr. Hussey.

"He ought to take them on an excursion on a special train once in a while," was Mr. Prince's contribution to the badinage.

"Laying jokes aside," said Mr. Burke, "I did not mean it in the sense of a personal criticism, Carney, and I hope you won't feel offended. I wanted to illustrate a point. An operator's deportment outside the exchange has a much wider scope of influence than inside. If the service is unsatisfactory for only a short time, the subscribers may attribute it to the operators, just from observations of such incidents as that at Princeville."

"Girls will be girls, though," argued Miss Floyd.

"But, nevertheless, a word of admonition as to their general conduct may not be wasted in the long run," Mr. Burke persisted.

"We cannot establish a plan of espionage upon them," said Mr. Telson.

"No, we cannot do that, but such things are bound to come to our attention sooner or later, and if the operator has been warned against them, I, for one, can be more liberal in dispensing discipline," said Miss Floyd.

"One of the most nonplusing excuses offered by an employe under discipline is, 'I didn't know it made any difference,'" said Mr. Burke. "If we insert a cautionary paragraph in our rule book, an operator cannot revert to that excuse."

"What is your view, Carney?" he continued amiably.

"I'll tell you, Burke," Mr. Carney answered, "I haven't formed an opinion as yet. But don't infer that I take the matter personally at all. The same thing might happen on my next visit to Florida, but I hope it won't. I agree that possibly something along that line ought to be said in the general instructions, but at present I should probably wish to make any such statement too drastic. You folks had better thrash it out among yourselves."

"Teacher, let's have recess," interposed Miss Sible.

"A good idea. Granted," Mr. Telson responded.

"Dark clouds in the heavens, and ice under foot,
There ain't any place for poor piggy to root,"

quoted Mr. Burke, looking out of the window.

"I suppose if the sky was clear, he'd have a place," observed Miss Floyd.

"I think he should have added, 'with apologies to Mother Goose,'" Miss Sible remarked.

"The only piggy I see is hanging in the butcher shop window, and he won't root any more," said Mr. Hussey.

"Mark it 'lines inspired by a dead pig,'" suggested Mr. Prince.

"Well, let's get busy and tell the operator how to behave herself on all occasions," said Mr. Telson, again resuming the chair.

"Well," Mr. Burke began, "while in the exchange the operator's deportment will reflect upon her efficiency in a direct manner; and while outside it will reflect upon the public's estimate of the service in general, in an indirect manner, so to speak. That divides the topic in two parts, at least."

"Isn't there anything in any of those books to give us light?" Mr. Prince inquired of Mr. Carney.

"Well, here is what it states in one book: 'An operator's

conduct should be ladylike and above reproach at all times.'"

"She is left to guess the 'why' of it, I presume," Mr. Burke remarked.

"That statement would not make much of an impression upon her, in my opinion," said Mr. Prince. "Any others?"

"'Operators will avoid conducting themselves in a manner which is liable to cause criticism by their associates or others with whom they may come in contact,'" Mr. Carney read.

"The same, but slightly more emphatic," was Mr. Burke's comment.

"That is the sum total of advice I have here," Mr. Carney observed.

"Well then, I presume we must go it alone," said Mr. Prince. "Let's follow Mr. Burke's suggestion and divide the subject. Her deportment in the exchange will have a bearing upon her standing as an operator, and be a factor in her chances for promotion. How can we best say that, if that is what we want to say?"

"Unladylike deportment in the exchange, or while on duty will be considered in the rating of her efficiency as an operator, and, therefore, affect her opportunities for advancement adversely," offered Miss Sible. "But that isn't exactly the way we should say it."

"Come, Burke, to the grindstone," said Mr. Jackson.

"'Unladylike deportment while on duty will affect her standing as an operator, and opportunities for advancement adversely,'" Mr. Burke replied.

"Then, while off duty, her conduct should be such that criticism—or rather above criticism," said Miss Sible. "How can we bring in the idea that it may cause criticism of the service?"

"I don't know that we can, but we ought to," Mr. Burke replied.

"'Unwarranted criticism of the service may result from unladylike conduct of an operator while not on duty,' might cover that part of it," Mr. Prince suggested.

"Doesn't that cover the whole case? What more is to be said?" Mr. Jackson observed.

"It does not occur to me that we can add anything to that to make it more emphatic," rejoined Mr. Burke.

"Now, perhaps we can revert to a topic in which our worthy associate from Princeville may display an interest," said Mr. Telson. "Who has a suggestion?"

"Something might be said about the care of valuables, such as money, rings, etc.," said Miss Floyd. "Such things so often disappear mysteriously in an exchange. My uncle, Colonel Cribb, actually paid an operator for a diamond ring she lost last month. Girls are sometimes in a hurry and inclined to be careless."

"We might state that the management will assume no responsibility for valuables of any sort," said Mr. Prince.

"Neither can we afford a place of safe-keeping for them," commented Mr. Carney.

"'The management will assume no responsibility for money or other valuables brought into the exchange by the operators. She should exercise such care of her valuable possessions as her judgment dictates,' might cover the case," said Mr. Burke.

"How about lockers? Why not instruct her to keep them there?" said Mr. Jackson.

"It has been my experience that more things are lost from lockers than anywhere else about an exchange," said Miss Sible. "I don't mean to imply that they are stolen, but when an operator goes to her locker she is usually in a hurry, and in removing her wraps, small things are caught in them, and disappear mysteriously. I once placed a bracelet in my locker, and forgot it when I went for my things to go home. While walking along the street, not far from the office, I heard something fall to the sidewalk, and my bracelet rolled right under my feet. It was caught in my hat or jacket, I don't know which. I would not advise telling an operator where to put anything in the way of valuables. That would be assuming part of the responsibility for their loss, if they were not found later."

"At this moment I have ascertained that dinner is waiting us, so we will adjourn for the time being," interposed Mr. Telson.

(To be Continued)

STATE TAXATION OF UTILITIES.

(Concluded from page 24.)

have been set out herein are made. It is practically impossible to formulate any table or schedule of comparisons which might be easily or quickly comprehended, because of the great lack of general uniformity in most of the states.

One or two instances are, however, worthy of note. Connecticut, for example, uses as her principal form of taxation of telephone companies, a charge of $1.10 on each transmitter in use in the state, and 35 cents on each mile of wire used for messages which cross the border of the state. Real estate is also subject to local taxation. In the District of Columbia, overhead wires and supporting poles are counted and taxed as realty. Michigan exempts from taxation telephone companies whose receipts are less than $500 per annum. There are other peculiarities, but they are of minor character, and—some of them—too complicated to take up in detail here.

The percentage of assessed to true value of property varies greatly in the different states, from as low as 25 per cent. to as high as 83 per cent. or even higher, judging from the few statistics available on that subject. The writer has found telephone lines assessed from $5 per mile to $277 per mile, although of course, the character of construction varied also. Generally, the exchange pays a higher proportionate tax than the toll line, counting all taxes paid. This is largely accounted for, of course, by the inclusion of municipal taxes, although it is believed that, municipal taxes excluded, the exchange usually bears a larger tax burden in proportion to its physical value than the toll line.

In one state, where figures were available, a company operating exchanges principally, paid taxes equivalent to 7.4 per cent. on its gross earnings, while a company operating both exchanges and long toll lines paid taxes equivalent to 5.01 per cent. on its gross earnings. The Bell telephone system, in 1912, according to its published report, paid taxes equivalent to 5 per cent. on its gross earnings. In the stated amounts paid by many companies, however, there is not included the large amount of free or bonus service given cities or municipal authorities under franchise agreements, which are, properly speaking, privilege or franchise taxes. The average state and county tax rate is 70 cents; the average city tax rate, $1.50 on the $100.

Throughout this article the District of Columbia, for brevity, has been treated as a state. For the figures and comparisons given, the author is indebted to the report of the Special Commission on Taxation of Corporations of Connecticut, from which liberal quotations have been made, and also to the state taxation authorities of more than 30 states, who have kindly furnished their printed reports and have courteously given all the information for which they were asked.

Court Asked to Fix Rate for Use of Bridge.

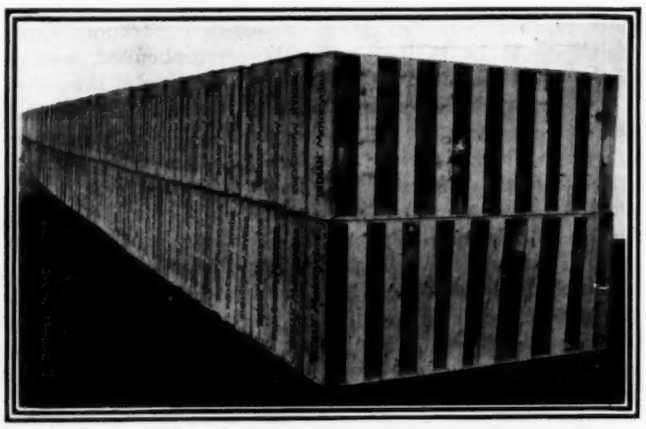
The Central District Telephone Co., of Pittsburgh, Pa., recently filed a petition asking the court to fix the rate Allegheny county may charge it for permitting it to run lines across the Ohio River bridge at Sewickley, Pa.

From Factory and Salesroom

Convention: Iowa, Des Moines, March 9, 10, 11; North Dakota, Grand Forks, March 24, 25; Eastern Pennsylvania, Harrisburg, April 7, 8

New York Telephone Co. Buys 220 Indian Motorcycles.

Probably constituting the largest single commercial motorcycle order ever placed, the recent purchase of 220 Indian motorcycles by the New York Telephone Co. is a remarkable tribute to the efficiency of the gasoline cycle in telephone service. It is no secret that the motorcycle has permanently established itself as an essential unit of plant



Indian Motorcycles for New York Telephone Co.

departments, of telephone companies, and the sales of machines to telephone companies have been steadily increasing.

Another significant phase of this record-breaking contract is the returning prosperity it forecasts. Not only is it a desirable piece of business landed by the Hendee Mfg. Co., but it indicates a loosening of the purse strings of great corporations for new equipment. The constant high efficiency which the public demands of the telephone service forces the company to subject its motorcycle trouble squad to extremely hard usage in all weathers in locating and remedying service interruptions which occur unexpectedly over a large territory.

Having been a large user of motorcycles for several years, the New York Telephone Co. has compiled very elaborate and accurate maintenance records, which show that its motorcycles are being operated at less than 1 cent per mile. It therefore was in a most excellent position to appraise values and its selection of the Indian motorcycle constitutes another recommendation by "Big Business."

Frank B. Cook Maintains a Reputation.

Frank B. Cook, Chicago, enjoys the novel reputation of always obtaining the winning end of a law suit. Further, it seems as though he is one of the few men who find it possible to make as much money out of litigation as the lawyers, if not more. He has just won a notable victory in a decision recently rendered by Judge Rose, sitting in the United States District Court of New York, in a case involving a considerable number of patents. These control, largely, the prevailing fire alarm and sprinkler systems. The defendants numbered, among others, the Automatic Fire Protection Co., the Fire Protection & Development Co., and the parent American District Telegraph Co.

In the case just decided, which dates back to 1903, Mr. Cook has, we are informed, spent a small fortune in its prosecution. Considering the age of the case, together with the amount of time and money Mr. Cook has devoted to it, there seems to be little doubt as to the merit of the reputation he enjoys, namely, that once he starts legal proceedings, he doesn't desist until every possible expedient has been exhausted.

In this particular case, the decision is wholly in Mr. Cook's favor and the accounting which the court has ordered will, it is estimated, result in an award of approximately $500,000 to Mr. Cook. On account of the age of the case, the payment of this award, according to Mr. Cook's attrneys, cannot be prolonged beyond one year from the date of the decision.

Stromberg-Carlson Exhibit at Illinois Convention.

An attractive and interesting exhibit at the convention of the Illinois Independent Telephone Association, held recently at the Leland Hotel, Springfield, Ill., was that of the Stromberg-Carlson Telephone Mfg. Co.

The products of the company exhibited included its standard line of apparatus. The popular No. A-5629 magneto switchboard with a capacity of 150 No. 11 plug-restoring drops created a favorable impression.

The various types of telephones shown were the No. 896 compact wall telephone, the No. 951 central energy short back-

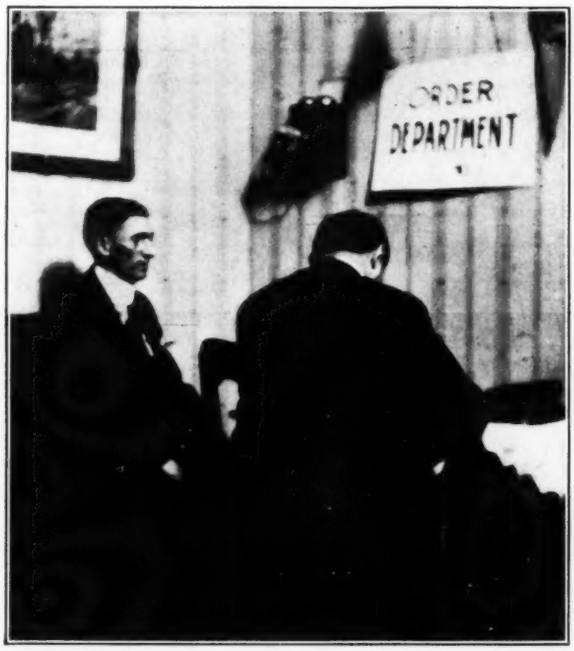
Stromberg-Carlson 150-Line Magneto Switchboard.

board business wall telephone, the No. 1126 and No. 1130 oak and all metal residence and hotel types and the popular No. 988 desk telephone with the induction coil mounted in the base.

The company's trade words "Quality First" were displayed in the corridor of the hotel, and also on neat card signs which were hung around different rooms of the hotel. Colored ban-

ners, each featuring a different type of product decorated the exhibit room.

A novel feature of the exhibit was the order department which was in charge of C. W. Shafer. The accompanying illus-



The Order Department, A Novel Feature of the Exhibit.

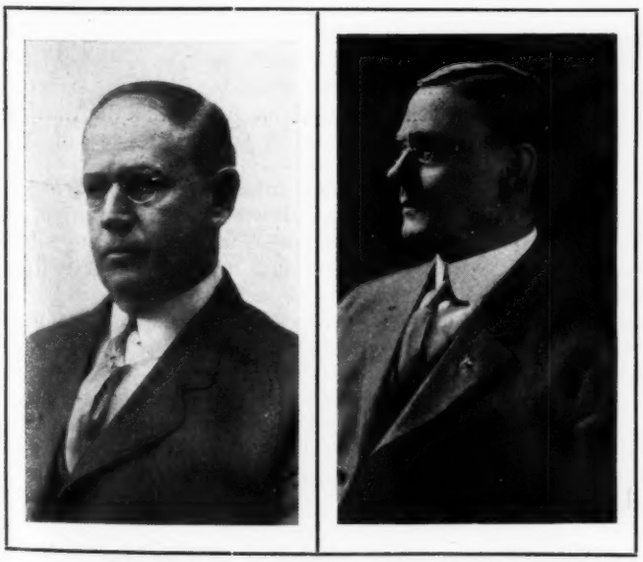
tration shows Mr. Shafer receiving the first order from F. E. Carville, of Kankakee, Ill.

P. D. Myers, who was in charge of the exhibit, gave a hearty welcome to all who visited the exhibit rooms.

Final Automanual Cut-Over at Lima, Ohio.

The consolidation of the former Central Union plant with that of the Lima Telephone & Telegraph Co., at Lima, Ohio, was completed through the installation and cut-over to the series B automanual switchboard on February 6.

Since 1896 the Lima telephone public has been confronted



D. J. Cable. **Geo. H. Metheany.**

with the dual plant problem and has received the benefits of competition, resulting in low rates, while soliciting campaigns carried the telephone to all classes. This situation resulted, after 19 years, in the abandonment of the old question, Home or Bell, and the telephone service in Lima is now exclusively Home.

The situation had become such that if a subscriber used principally local service, he was classed as a Home subscriber; but if he had occasion to call out of state long distance points, he had to have the Bell telephone. And a local dealer was compelled to have both telephones. This classification worked out to the end that the Home company comprised a list of 5,396 subscribers, the Bell 2,100, and the class using both telephones, only 600. However, this last class supplies the surprise of the event, as it was these subscribers who raised the greatest complaint against the burden of dual service and to them, dual cost.

After the purchase of the Central Union (Bell) plant by the Lima Telephone & Telegraph Co., which received the approval of the Ohio Public Utilities Commission as well as the local subscribers, a canvass was made of those having both telephones, and only 100 of them finally determined that one telephone line would not be sufficient for their requirements. The originating toll service at Lima is now handled through a Y board, having order wires extending to the toll switchboards of the United States (Independent) Long Distance Telephone Co. and the Central Union (Bell) Teleprone Co., which companies operate their own lines in separate offices.

In making this consolidation of two separate plants, having

John D. Falls. **Gustav Hirsch.**

the same numbers for subscribers in their directory, it was found necessary to change all numbers, and in doing so, a simple and unique change was made. The harmonic party system being used, the frequency indications are termed: "Main," "High," "State" and "Lake." These designations are entered in the directory as prefixes, leaving only the line number to be entered for subscribers' complete numbers. P. B. X. lines are arranged in groups and the switches select the idle trunk automatically, thereby making it only necessary to enter one number for each P. B.X. subscriber, regardless of the number of trunks employed. As branch exchanges are constructed, their lines will take individual thousands, and subbranches will be given distinctive hundreds. This plan therefore precludes the necessity of "affixes" ever being required.

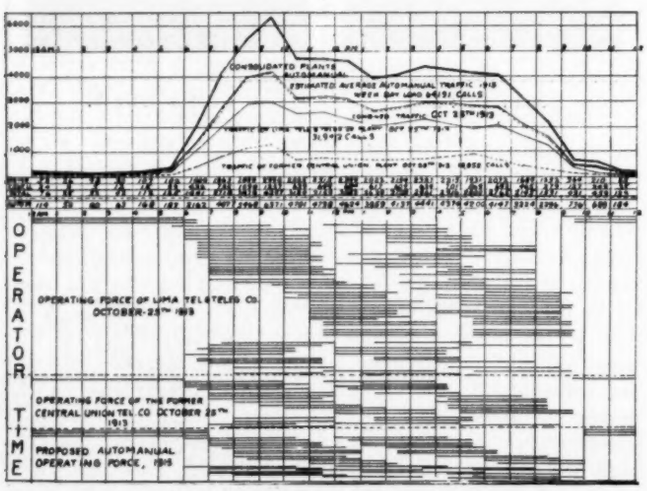
Suburban subscribers are listed with the prefix "suburban," which automatically trunks the calls to that switchboard, at which point the suburban operators complete the connections to the magneto lines. Ultimately these lines will be transformed to common battery, when other prefixes representing the rural frequencies will be given, and the lines will then enter the automanual switchboard direct and the suburban sections will be abandoned.

The final cut-over to the new switchboard was made on the night of Saturday, February 6, when the cables were spliced through from the automanual office to connect with the remaining 1,600 lines supplying service to business subscribers located between the old Home office and the new automanual Home office.

In anticipation of a rush of business on Sunday and Monday, February 7 and 8, John A. Harrison, traffic superintendent, had made arrangements for a full complement of operators to fill the 15 key-set positions of the automanual system, during the heavy load hours. It was expected that the patrons of the Bell and Home companies, who had enjoyed no telephonic intercourse, during the 19 years of "war," would try out the innovation of consolidated service, and visit some. Undoubtedly, this factor contributed to some extent, but the absorbing interest to the subscribers proved to be the innovation supplied with the installation of the series B automanual, as compared with manual.

The first surprise was the immediate answer by the operator, and upon making a re-call, they found that simply replacing the receiver a moment gave them the first idle operator at once. They noted from the instructions found in the new service directory that they would receive an automatic ring-back while their called-for party's bell was periodically ringing; or the busy tone signal, if the line called for was in use. They found the improved transmission, without any clicks or bangs in the ear, to be a pleasant relief; and last, but not least, that the service was as regular as a clock tick and entirely private, as the operator was automatically disconnected as soon as the number was received and set up on the key-set.

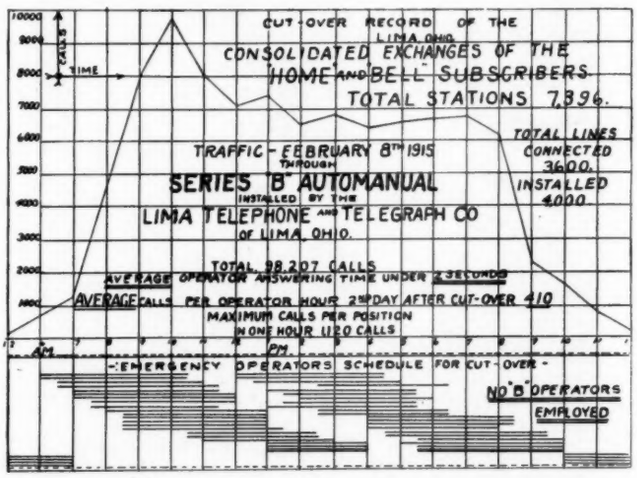
Upon completion of the cut-over, the telephone men, who were responsible for the successful erection of the new switchboard, made service observations, and satisfied themselves that every anticipated result had been realized under an entirely unexpected traffic load. These men are: H. G. Webster, chief engineer of the Telephone Improvement Co., under whose direction the series B automanual was engineered; Geo. W. Dickerson, manager of the North Electric Co., manufacturer of the automanual equipment; Gustav Hirsch, consulting engineer, who supervised the physical plant consolidation at Lima; D. J. Cable, president of the Lima Telephone & Telegraph Co.; Geo. H. Metheany, general manager; John D. Falls, general plant superintendent, and John A. Harrison, traffic engineer, in charge of service and operating.


OPERATOR TIME
OPERATING FORCE OF LIMA TEL&TELEG CO. OCTOBER-25TH 1913
OPERATING FORCE OF THE FORMER CENTRAL UNION TEL CO OCTOBER 25TH 1913
PROPOSED AUTOMANUAL OPERATING FORCE, 1915

Comparison of Traffic and Operators' Schedules.

It was found, as in nearly all telephone exchanges, that the Monday morning traffic sets the record for the week. Arrangements had therefore, been made to have each of the 15 operators' positions filled, in order that the operators, all new to the automanual switchboard, could secure as much experience as possible, and to select the most apt pupils for the regular service, although ten operators are sufficient to handle what was expected to be the normal Monday business.

By seven a. m. Monday, February 8, the load reached beyond the record load of both plants, under manual conditions, and


CUT-OVER RECORD OF THE LIMA OHIO
CONSOLIDATED EXCHANGES OF THE HOME AND BELL SUBSCRIBERS
TOTAL STATIONS 7,396.
CALLS
TIME
TRAFFIC - FEBRUARY 8TH 1915 THROUGH
SERIES "B" AUTOMANUAL
INSTALLED BY THE
LIMA TELEPHONE AND TELEGRAPH CO OF LIMA, OHIO.
TOTAL LINES CONNECTED 3600.
INSTALLED 4000
TOTAL 98,207 CALLS
AVERAGE OPERATOR ANSWERING TIME UNDER 2 SECONDS
AVERAGE CALLS PER OPERATOR HOUR 2ND DAY AFTER CUT-OVER 410
MAXIMUM CALLS PER POSITION IN ONE HOUR 1120 CALLS
AM
PM
EMERGENCY OPERATORS SCHEDULE FOR CUT-OVER -
NO "B" OPERATORS EMPLOYED

Excess Load Following Automanual Cut-Over at Lima, Ohio.

at ten o'clock it was found that during the preceding hour, the operators' call meters had registered over 10,000 calls, and the inexperienced operators were working like veterans. During this hour one operator completed 1,122 calls. The load for the 24-hours, closing Monday at midnight, was over 98,000 calls, and the inexperienced operators handled this traffic with an average of 410 calls per operator hour.

The traffic charts and operators' schedules, shown in the accompanying illustrations, give an interesting insight into the results of the consolidation of the competing systems and the effect of the improved service.

Paragraphs.

THE COFFEY SYSTEM & AUDIT CO., of Indianapolis, Ind., is installing its accounting system at Le Mars, Iowa, and Johnstown, Pa.

THE NORTHWESTERN BUZZER, issued by the **Northwestern** Electric Equipment Co., of St. Paul, Minn., in its February number, featured an article by James J. Hill on "Electricity, the Most Adaptable Physical Force." Another article of interest to telephone men is Mr. Vivian's account of the convention of the Independent Telephone Association of America, held at Minneapolis the latter part of January.

Telephone Patrol System for Mounted Police.

The Canadian patrol system, with telephones at each point where the police "make their posts" will be put into effect in Louisville, Ky., in the near future over a large section of the southern and western parts of the city, the sections which are patrolled by mounted policemen. This is in accordance with plans which have been worked out by the chief of police and approved by the board of public safety.

There will be 24 mounted police in this branch of the service and the system will be worked out so that once each half hour every man visits the telephone station, at a central station some one of the policemen will be on duty 40 minutes out of each hour.

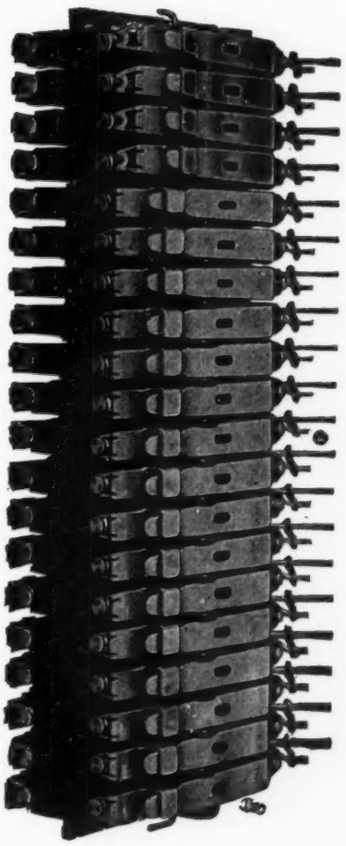
Visitors Inspect New Exchange at Hastings, Neb.

The Lincoln Telephone & Telegraph Co. recently celebrated the opening of its new $300,000 exchange at Hastings, Neb. Visitors were conducted through the building and the operation of the switchboard explained by the operators and other employes.

COOK CO.

TELEPHONE SYSTEMS-PROTECTIVE APPARATUS AND SUPPLIES

COOK'S No. 10 Protector has been "the hero" of many a battle



It protects itself as well as the Apparatus.

The highest type of switchboard protective apparatus.

The following features enable it to give "uninterrupted" protection:

Heat coil cannot burn out or short circuit.

Can be no defective coils.

No loose contacts in circuit.

All springs insulated and separated from adjacent springs.

Eventually you will use it. Why not now?

Frank B Cook Co.

326 West Madison Street

Chicago

CHICAGO

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

Condensed News Reports

Officers of Companies Are Urgently Requested to Forward to Us Promptly All Financial and Other Statements as Soon as Issued and Any Items of Interest as to Their Plants and Systems

Personal.

DR. MICHAEL IDVORSKY PUPIN, professor of electro-mechanics at the Columbia University, New York, was born on the southern frontier of Austria-Hungary in 1858. He is the inventor of the loading coil which bears his name and which has been such an important factor in the development of long distance telephony, resulting in "Coast to Coast" telephony in this country.

Dr. M. I. Pupin.

Although born in Hungary, Dr. Pupin is of Servian ancestry. He came to America in 1874 when he was a little under 16 years of age. His first empolyment was as a rubber in a Turkish bath. After many vicissitudes he obtained a scholarship at Adelphi Academy, Brooklyn, and graduated from that institution. He entered the Columbia University in 1879 at the age of 21 and graduated at the head of his class in 1883 with the degree of Bachelor of Arts.

He then went to Europe, studying at Cambridge and Berlin and later studying under Helmholtz, Bunsen and Kirchhoff. In 1889 he received the degree of Doctor of Philosophy from the University of Berlin.

In the same year he was appointed instructor in the Columbia University, New York, later being made full professor of electro-mechanics at that institution. In 1904 he received the degree of Doctor of Science from the Columbia University.

In 1895 Dr. Pupin began a series of experiments and after a painstaking mathematical study, his researches resulted in the invention of the famous Pupin loading coil which was publicly announced in 1901.

Dr. Pupin is a fellow of the American Society for the Advancement of Science, the New York Academy of Sciences, a member of the National Academy of Sciences, the American Philosophical Society, the American Physical Society, the American Mathematical Society and the American Institute of Electrical Engineers.

He is honorary representative of the Servian government in the United States and at the present time is devoting all his time on behalf of his struggling countrymen.

Dr. Pupin is a splendid illustration of a man who seeks his opportunity and turns it to advantage.

C. L. HARVILL, of Greensburg, Ky., has been appointed manager of the Cumberland Telephone & Telegraph Co., at Milton, Ky., succeeding V. C. Harmon, resigned.

C. E. TRAVIS, of Rockport, Ind., has resigned his position as manager of the Cumberland Telephone & Telegraph Co. in that city. Mr. Travis will make his home in Owensboro, Ky.

F. L. CHILDERS, formerly cashier for the Fort Worth, Texas, office of the Southwestern Telegraph & Telephone Co., has been promoted to the managership of the Hubbard City, Texas, office.

W. L. SHINAULT, for the past six months manager of the Baldwyn Home Telephone Co., at Baldwyn, Miss., has resigned his position. H. P. Harris, of Corinth, Miss., who was formerly manager at Baldwyn, has accepted the position.

OSCAR QUALE, for the past five years manager of the Baraboo, Wis., exchange of the Wisconsin Telephone Co., has been made manager of the Reedsburg Telephone Co., of Reedsburg, Wis., to succeed E. G. Stoltze, deceased.

FRED COLE, manager of the Hudson, Mich., exchange of the Lenawee County Telephone Co., has resigned and will move to his farm near Rollin, Mich. Harry Kirkup, formerly repairman for the company, has been promoted to the position of manager.

S. M. VINSON, manager of the Sonora (Ky.) Telephone Co., was recently united in wedlock to Mrs. Valeria Hughes, who was formerly chief operator at Glasgow, Ky. The ceremony took place at the home of the bride's parents, Mr. and Mrs. W. Y. Poynter, in Glasgow.

LEVIN S. BROWN, of Paris, Ky., eastern district cable superintendent for the Central Home Telephone & Telegraph Co., was recently married to Miss Margaret Clark, formerly chief operator at the Paducah exchange of the company.

Elections.

WHITTIER, CAL.—The Whittier Home Telephone Co. held its annual meeting recently and elected the following officers for the ensuing year: S. M. Smith, president; E. W. Bacon, vice-president; A. Wardsman, secretary and manager; J. G. Swain, assistant secretary; O. C. Spencer and O. H. Gallup, directors.

RAPATEE, ILL.—The Rapatee & Maquon Farmers' Telephone Co. held its annual election recently with the following results: E. Foster, president; D. F. Foster, secretary and treasurer.

WINDSOR, ILL.—The stockholders of the Windsor Mutual Telephone Co. held their annual election recently, which resulted as follows: President, G. Garvin; vice-president, J. H. Wallace; secretary, R. C. Grays; treasurer, A. C. Grays.

CLARKSHILL, IND.—The Farmers' Co-operative Telephone Co. recently elected the following officers for the coming year: Quincy Daugherty, president; Clinton McDole, treasurer; H. M. Mugg, secretary; directors, E. V. Loveless; J. Smith, C. Nicewander and Will Scanlon.

PETERSBURG, IND.—The board of directors of the Pike County Telephone Co. elected the following officers at a recent meeting: R. M. Craig, president; L. C. Thomas, vice-president; F. J. Burger, treasurer; S. C. Lemon, secretary; C. P. Head, manager.

ELDRIDGE, IOWA.—The stockholders of the Eldridge Mutual Telephone Co. elected the following officers at their annual meeting: President, John Hansen; vice-president, A. H. Lamp; secretary, M. H. Calderwood; treasurer, Albert Ottzman; directors, F. Keppy, G. Grell, Fred Baustian, R. Kock and Fred Krambeck.

MORRISON, IOWA.—The annual meeting of the Whiteside Farmers' Mutual Telephone Co. was held recently and the officers for the coming year were elected as follows: President, J. A. Riordan; vice-president, J. H. Martin; secretary, F. Trautwein; treasurer, R. E. Cochran; directors, R. S. James, H. C. Allen, E. A. Likes, J. S. Burns and J. W. Bechtel.

TEMPLETON, IOWA.—The Templeton Telephone Co. recently elected the following officers for the coming year: John Heithoff, president; Frank Greteman, secretary; Henry Drees, Joe Reiman and H. Bruggeman, directors.

WINFIELD, IOWA.—The stockholders of the Winfield Telephone Co. held their annual meeting recently and elected the following officers for the ensuing year: President, J. A. Baxter; vice-president, J. W. Hanna; secretary and superintendent, J. E. Huston; treasurer, B. B. Lindly.

GALESBURG, KANS.—The Galesburg Telephone Co. has elected the following officers: L. E. Waggoner, president; Sam Reed, treasurer.

MCCUNE, KANS.—The McCune Telephone Co. has elected the following officers at its annual stockholders' meeting: T. C. Fair, president; W. M. Sayres, vice-president; W. T. Highland, secretary; Fred Colburn, treasurer; E. Munday, J. B. Taylor and D. Walker, directors.

OKETO, KANS.—At the annual meeting of the stockholders of the Oketo Mutual Telephone Co. the following officers were